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OFFICIAL PUBLICATION OF
IOWA STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS

Vol. XV MARCH 10, 1917 No. 30

IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS

EDMUND J. JAMES

REPORTS

FOR THE BIENNIUM ENDING JUNE 30, 1916

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AND

RECOMMENDATIONS

FOR THE BIENNIUM ENDING JUNE 30, 1919

BY THE

PRESIDENT OF THE COLLEGE

AND THE

STATE BOARD OF EDUCATION

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Ames, Iowa

Published Tri-Monthly by the Iowa State College of Agriculture and
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Iowa State College
# of Agriculture and Mechanic Arts

Reports and Recommendations

BY THE

President of the College

AND THE

State Board of Education

INTRODUCTORY STATEMENT.

The following pages are reprinted from the biennial report of the Iowa State Board of Education to the Governor and the Thirty-seventh General Assembly. These pages comprise the summary of appropriations as recommended to the Thirty-seventh General Assembly by the Iowa State Board of Education for the Iowa State College of Agriculture and Mechanic Arts, and reports by the President of the College to the State Board of Education upon Educational and Industrial Service work during the biennium ending June 30, 1916, and recommendations by the President of the College to the State Board of Education for appropriations for the biennium beginning July 1, 1917.

SUMMARY OF APPROPRIATIONS RECOMMENDED TO THE THIRTY-SEVENTH GENERAL ASSEMBLY BY THE IOWA STATE BOARD OF EDUCATION FOR IOWA STATE COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

I. ABSOLUTE NEEDS.

A. *Increase of Maintenance Appropriations—Annual.*

1.	Permanent Collegiate Support Fund	$ 98,000.00
2.	Summer Session	5,000.00
3.	Sub-Collegiate Courses in Agriculture, Home Economics and Engineering	3,000.00
4.	Contingent Fund, Repairs and Minor Improvements	4,000.00
5.	Library, Books and Periodicals	10,000.00
6.	Maintenance and Improvement of Public Grounds	5,000.00
	Total Increase Annually	$125,000.00

B. *Special Appropriations for the Biennium 1917-1919.*

1.	Equipment and Furnishings for Buildings and Departments	$175,000.00
2.	Enlargement of Buildings and Small Additional Buildings	15,000.00
3.	Extension of Heating System and Equipment of Heating Plant	25,000.00
4.	Sewer Construction	30,000.00
5.	Repairs and Improvements of Stock Barns, Judging Pavilions and Fences	5,000.00
	Total for Biennium	$250,000.00

II. FOR ENLARGING THE SCOPE OF THE INSTITUTION—DESIRABLE.

C. *Increase of Appropriation for Industrial Service Work—Annual.*

Soil Survey	$50,000.00

III. FOR ADDITIONAL LAND—DESIRABLE.

D. *Special Appropriations for the Biennium 1917-1919.*

1.	Animal Husbandry Farm and Equipment	$ 75,000.00
2.	Additional Property near the Campus	45,250.00
3.	Patten Property	10,000.00
	Total for the Biennium	$130,250.00

BRIEF ARGUMENT IN SUPPORT OF RECOMMENDATIONS FOR APPROPRIATIONS.

A. *Increase of Maintenance Appropriations, Beginning July 1, 1917—Annual.*

1. Permanent Collegiate Support Fund	$98,000.00

The necessity for this asking is due to the following:

1. The increasing number of students.
2. The increasing cost of living.
3. Competition from other institutions.
4. The continued development of the sciences and their application to the industries.
5. Fuel, light and janitor service.

The student enrollment in courses extending throughout the full college year increased from 1,800 in 1911-12 to 2,878 in 1915-16, more than 1,000 in four years. Although some additional teachers have been appointed, the faculty needs much more relief along this line. Without more help, the present teachers cannot do their best work. Official reports show that they are overworked.

The increasing cost of living falls heavily upon teachers whose income is fixed. It is now almost impossible for many teachers to keep their necessary expenses within their incomes. Two years ago it was announced that there should be no general increase of salaries, and increases have been restricted as far as possible. As a rule, such increases as have been allowed have been very small. There have been many resignations on account of small salaries. In one department having twelve teachers, only three have been in service here over two years. The changes have been due to better inducements offered elsewhere. During the biennium twenty-eight professors resigned, besides about sixty teachers of lower rank. The effect of so many changes is very serious.

Other institutions pay as much as $1,000 a year more than is paid at Iowa State College for positions of certain grades. Even high schools frequently offer better inducements than this college can hold out.

The scope of instruction in a technical institution must continually widen to keep up with the developments of science. At the present time there is necessity for the establishing of new branches of work at this college, and for the strengthening of others, including the science of breeding, nutrition, chemical engineering and business methods as related to the industries. It should be remembered that the cost of such instruction ranks high as compared with most university or college work.

As new buildings are erected to accommodate the larger student enrollment fuel, light and janitor service cost more, and this increase is emphasized by the increasing cost of supplies and labor.

The amount here recommended as an increase would provide for only a very small percentage of increase in the salaries of the present teachers: it would permit the employment of about one additional teacher for each twenty on the staff; and it would provide for additional departmental expenses, including an item of about $17,000 for fuel, light and janitor service.

2. Summer Session $5,000.00

The Summer Session enables the state to keep its equipment in use during a long period when otherwise most of it would be inactive. This session accommodates a growing number of students, many of whom are unable to attend college during the winter season. It is serving an especially valuable purpose in assisting school teachers to prepare themselves to teach industrial subjects.

3. Sub-Collegiate Courses in Agriculture, Home Economics and Engineering $3,000.00

These courses are serving a large group of young people who are denied or who do not care for the regular college courses. The environment furnished by the college is worth a great deal to the non-collegiate courses, which are better developed and better equipped than would be possible at any separate institution. These courses should be made better known throughout the state.

4. Contingent Fund, Repairs and Minor Improvements........$4,000.00

On account of the increased extent and value of the physical plant of the institution, an increase is especially needed for the contingent fund. Furthermore, it is impossible to foretell what contingencies might arise in connection with a plant of this size.

5. Library, Books and Periodicals..........................$10,000.00

It has been impossible to keep up even with current scientific literature. Larger appropriations are needed for book purchases. Members of the faculty, research students and other experts are greatly handicapped in their investigations for want of reports upon corresponding work at other places in this country and in foreign countries. Considerable money is now expended for postage on books that are borrowed from other libraries. This borrowing is attended by delays, and, too often, by the necessity of immediately returning the volume. It has been pointed out that money expended for reference books is an economy because it enables investigators to learn quickly and accurately of experiments elsewhere, and thus it saves the time and expense which would be lost in duplicating the experiments. It is felt that the additional asking for books is very modest.

6. Maintenance and improvement of Public Grounds...........$5,000.00

Additional funds are needed to care for a larger area which is due to the location of certain new buildings; to take better care of exercise grounds for the student body; and to make numerous improvements, such as concrete sidewalks, rain water disposal, etc.

B. *Special Appropriations for the Biennium, Beginning July 1, 1917.*

1. Equipment and Furnishings for Buildings and Departments $175,000.00

For a long time, several large branches of the college have been deficient in equipment because the purchases have cared for only the most pressing needs arising from the increased enrollment in classes. Considerable scientific equipment, such as is commonly found in the best technical institutions, should be purchased. Additional live stock is needed to furnish the essentials for maintaining representatives of various breeds which are especially needed in the stock judging classes.

The new Chemistry Building is only partly equipped, the Board having adopted the policy of furnishing this building through the aid of annual allotments. The physics department, the veterinary department and some of the agricultural departments are particularly deficient in equipment.

It will also be necessary to provide equipment for new buildings authorized, but not yet constructed. The need for equipment is much larger than the sum asked for.

2. Enlargement of Buildings and small additional buildings...$15,000.00

Numerous small buildings are needed on farms and campus as given below. At least $50,000 could be used advantageously for these buildings, but with the amount named the most pressing needs could be partially cared for. Among the buildings in this list are the following:

Cottages for foremen and laborers	$15,000.00
Machinery Shed for Farm Department	1,500.00
Botany Laboratory and Greenhouse	4,000.00
Mining Engineering Laboratory	7,000.00
Home Economics Practice House	6,000.00
Isolation Ward	6,000.00
Machinery Shed for Grounds Department	2,000.00
Agronomy Farm Building	5,000.00

3. Extension of Heating System and Equipment of Heating Plant ...$25,000.00

A new generator is needed for the heating plant, because of increased demands for electric current in shops and laboratories, and on account of the lighting of additional buildings. A suitable generator would cost approximately $16,000.00. There is also need of an additional tunnel on a lower level than the present tunnels, for the benefit of new buildings on the north side of the campus and to provide better return of condensation from steam circulated through the present tunnels. The balance remaining after the purchase of the generator will allow only the beginning of a tunnel of this kind. The additional amount needed should be provided as soon as possible.

4. Sewer Construction ...$30,000.00

The present facilities for sewage disposal are outgrown, and the result is that raw sewage flows directly into Campus Creek and thence into Squaw Creek. It is hoped to secure some relief by inducing the City of Ames to withdraw from the agreement entered into, under special authority, some years ago. In that case it will become necessary to refund to the city the amount it has invested in the disposal plant on the college grounds. It is now proposed to make a new sewage disposal bed at a more favorable location than the present site and to locate it where it may serve practically the entire campus at a future time if this is desired, but for the present both the old and the new beds would be used.

5. Repairs and Improvements of Stock Barns, Judging Pavilions and Fences $5,000.00

Some of the older farm structures are very much in need of repairs and improvements which would be too expensive to be cared for from the college repair fund. It has been necessary to re-adapt some of these old buildings to modern requirements. Furthermore, in a good many places, timbers and posts have worn out or rotted out and need to be replaced.

C. *Increase of Appropriations for Industrial Service Work—Annual.*

Soil Survey $50,000.00

The Agricultural Experiment Station is being called upon constantly for soils surveys in different parts of the state. Thousands of taxpayers have signed petitions asking that this fundamental work be done by the experiment station as it is done in other states. Contrary to the reputation of the state in most quarters, the Iowa soils are showing need of special attention. The first step to be taken is a soil survey. This is an inventory of soils, and the information secured is of great value to the farming people. It is necessary for further studies of soil improvement. This is a problem of enormous proportions, and it has direct bearing upon many millions of dollars in farm values and farm products.

D. *Special Appropriations for the Biennium, Beginning July 1, 1917.*

1. Animal Husbandry Farm and Equipment..................$75,000.00

Animal Husbandry represents enormous interests in Iowa, and the College should have an animal husbandry farm that would compare at least with many a good stock farm in the state. At the present time, it has no animal husbandry farm. The stock is cared for in buildings and on lands poorly suited for the purpose, and is crowded by the general college developments. The University of Illinois has spent hundreds of thousands of dollars for farm land for its College of Agriculture. Wisconsin and other states have better facilities in this respect than obtain in Iowa. It is urgently recommended that an appropriation be made so that an animal husbandry farm may be established. In this way, many present handicaps to the work would be overcome immediately. A limited amount of equipment should be secured with the purchase of the farm.

2. Additional Property near the Campus....................$45,250.00

Additional land adjacent to the campus is needed for college purposes, and options have been secured on the lots on Lincoln Way opposite the campus, and between Ash and Lynn Streets. This land is favorably located for dormitories; and its purchase would relieve the campus and, at the same time, protect the college grounds from undesirable encroachments. The options have been secured through the efforts of friends of the college, and will be good until April 1, 1917.

3. Patten Property.. $10,000.00

A leading horticulturist of this state has said: "Mr. Patten is a genius in his way, and has done more than any other man east of the Rocky Mountains. The work of Mr. Burbank, of California, does not count, as his productions are not suited to this climate, and are mostly failures here. Mr. Patten has the most extensive laboratory for producing new and adapted varieties of fruits that exists between the Rocky Mountains and the Atlantic Ocean. He has spent his life and strength at this work for more than forty years."

Mr. Patten has given the Iowa State College an option on this property for the purchase price of $10,000.00.

REPORT BY THE PRESIDENT OF THE COLLEGE ON EDUCATIONAL WORK, IMPROVEMENTS, AND ENLARGEMENTS AT THE COLLEGE IN THE BIENNIUM JULY 1, 1914, TO JUNE 30, 1916, WITH RECOMMENDATIONS FOR APPROPRIATIONS FOR THE BIENNIUM BEGINNING JULY 1, 1917.

R. A. PEARSON, PRESIDENT.

THE STUDENT BODY.

ENROLLMENT.

At the close of the biennium, the enrollment of collegiate, including graduate, students was 2,511. This was an increase of 421 during the biennium, and this is in addition to an increase of 520 during the preceding biennium. In five years, the collegiate enrollment has increased 1,027. In nine years, it has more than doubled. When non-collegiate and summer session enrollments are included, as is commonly done when college attendance is announced, the enrollment at the close of last year was 3,537. This is an increase of 926 in two years, and it is more than double the enrollment of five years earlier. This number of students has taxed the facilities of the college and has kept the faculty and administrative officers alert and anxious in their efforts to provide for all proper demands from both students and departments.

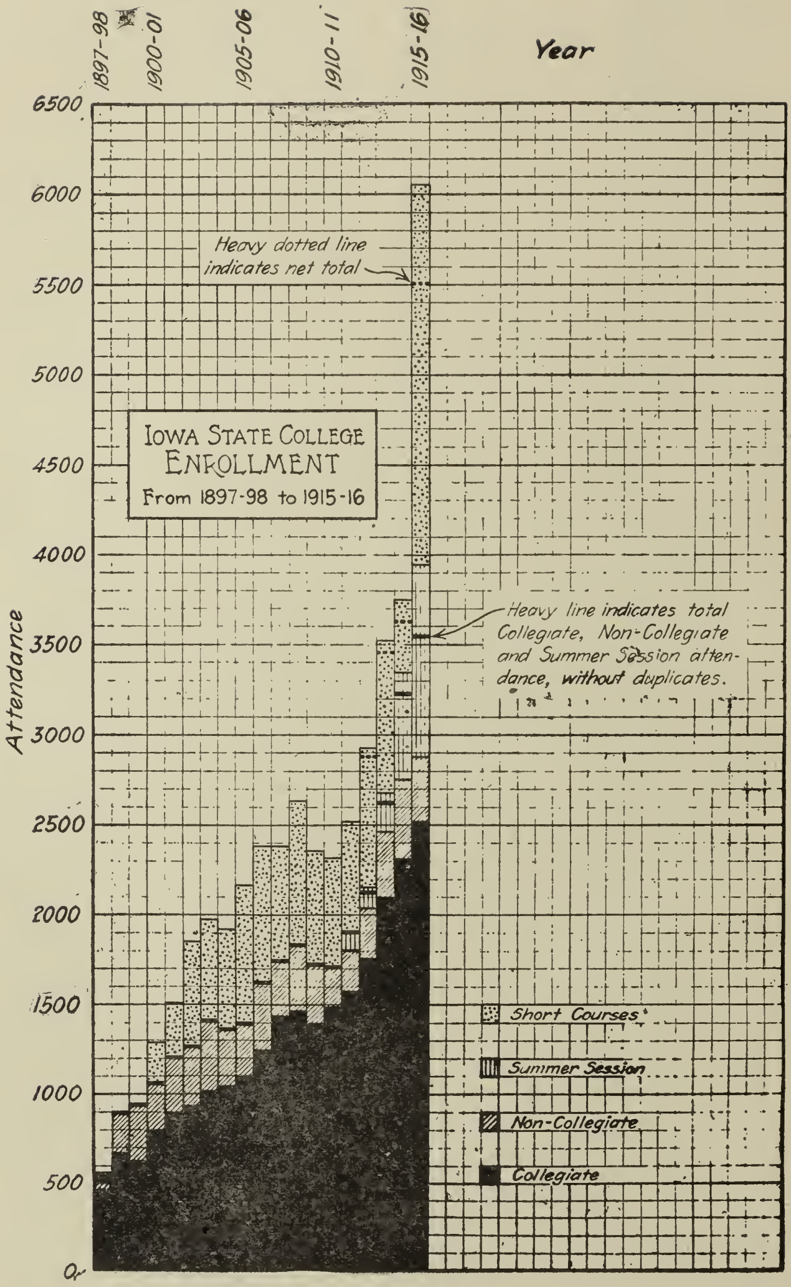
The following table and the accompanying chart show the enrollment of the college, by years and principal groups, annually, from 1897-98 to the present time:

ENROLLMENT AT IOWA STATE COLLEGE, 1897-1898 TO 1915-1916.

Character of Courses	97–98	98–99	99–00	00–01	01–02	02–03	03–04	04–05	05–06	06–07	07–08	08–09	09–10	10–11	11–12	12–13	13–14	14–15*	15–16
Collegiate:																			
Graduate	17	15	24	20	------	6	22	13	23	15	14	14	20	16	22	15	26	69	103
Agriculture	91	205	205	237	226	276	253	267	268	343	398	426	448	513	578	681	807	823	900
Agricultural Engineering	------	------	------	------	------	------	------	------	------	------	------	------	10	34	57	89	135	136	104
Engineering	137	195	220	315	415	443	505	530	570	592	704	681	586	587	528	495	615	602	642
Home Economics	52	73	58	68	92	82	95	95	40	45	64	97	121	149	206	321	446	521	546
Science	148	142	70	102	106	76	86	66	135	165	146	113	84	76	81	70	78	84	107
Veterinary	9	37	43	47	59	48	52	66	56	82	108	126	115	100	85	70	76	81	109
Music	------	------	------	------	------	------	------	------	------	------	------	9	14	9	13	9	7	3	------
Net total	454	667	620	789	898	931	1,013	1,037	1,092	1,242	1,434	1,466	1,398	1,484	1,570	1,750	2,090	2,319	2,511
Non-collegiate:																			
Preparatory	------	24	24	42	33	66	34	29	37	37	20	26	21	------	------	------	------	------	------
Two and one-year Agriculture	71	124	154	101	94	100	104	64	81	105	82	132	119	148	188	218	275	249	230
Two-year Engineering	------	61	116	115	128	135	174	176	145	211	139	114	93	1	------	------	22	65	39
Two-year Home Economics	------	20	26	17	22	15	9	15	------	------	8	28	19	------	------	------	24	51	58
Music	------	------	------	------	27	21	78	42	31	21	56	69	73	79	42	66	48	62	40
Net total	71	229	320	275	304	337	399	326	294	374	305	369	325	228	230	284	369	427	367
Net total of Collegiate and Non-collegiate	525	896	940	1,064	1,202	1,268	1,412	1,363	1,386	1,616	1,739	1,835	1,723	1,712	1,800	2,034	2,459	2,746	2,878
Summer Session:																			
Total	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	128	215	601	1,055
Duplicates	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	44	63	116	396
Net total	------	------	------	------	------	------	------	------	------	------	------	------	------	------	96	84	152	485	659
Net total of Collegiate, Non-collegiate and Summer Session	525	896	940	1,064	1,202	1,268	1.412	1,363	1,386	1,616	1,739	1,835	1,723	1,712	1,896	2,118	2,611	3,231	3,537

Short Courses:																				
Agriculture	22	------	------	229	300	578	558	552	737	733	605	747	576	555	567	703	604	292	1,764
Home Economics	------	------	------	------	------	------	------	------	------	32	37	49	51	40	47	61	54	22	229
Engineering	----	------	------	------	------	------	------	------	39	------	------	------	------	------	------	------	189	84	134
Total	22	------	------	229	300	578	558	552	776	765	642	796	627	595	614	764	847	398	2,127
Duplicates	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	162
Net total	22	------	------	229	300	578	558	552	776	765	642	796	627	595	614	764	847	398	1,965
Grand total (net)	547	896	940	1,293	1,502	1,846	1,970	1,915	2,162	2,381	2,381	2,631	2,350	2,307	2,510	2,882	3,458	3,629	5,502

*The regular Winter Short Course was not held in 1914-1915 on account of the foot and mouth disease.


IOWA STATE COLLEGE
ENROLLMENT
From 1897-98 to 1915-16
Year
1897-98
1900-01
1905-06
1910-11
1915-16
Attendance
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Heavy dotted line indicates net total
Heavy line indicates total Collegiate, Non-Collegiate and Summer Session attendance, without duplicates.
Short Courses
Summer Session
Non-Collegiate
Collegiate

SUMMARY OF ENROLLMENT FOR BIENNIUM.

The following table shows the number of students in each class and course during the years 1914-15 and 1915-16:

1. Graduate Division:

	Year 1914-15.			Year 1915-16		
Agriculture—						
Agronomy	22			13		
Animal Husbandry	8			14		
Dairying	2			4		
Farm Management	1			2		
Horticulture	..			5		
		33			38	
Engineering—						
Ceramics	1			1		
Engineering	..			...		
Highway Engineering	2					
		3			1	
Home Economics		3			...	
Industrial Science		30			64	
			69			103

2. Division of Agriculture:

	Year 1914-15.		Year 1915-16	
Senior Class—				
Agricultural Education	11		11	
Agricultural Engineering	12		20	
Agronomy	20		38	
Animal Husbandry	71		60	
Dairying	14		10	
Forestry	6		7	
Horticulture	6		6	
		140		152
Junior Class—				
Agricultural Education	8		11	
Agricultural Engineering	22		32	
Agronomy	41		33	
Animal Husbandry	62		94	
Dairying	11		9	
Farm Management	..		3	
Forestry	15		9	
Horticulture	6		14	
		165		205
Sophomore Class—				
Agricultural Education	10		3	
Agricultural Engineering	40		23	
Agronomy	37		31	
Animal Husbandry	116		123	
Dairying	10		17	
Farm Management	..		9	
Forestry	8		16	
Horticulture	10		11	
Two-Year Collegiate Agriculture	7		5	
		238		238
Freshman Class—				
Agricultural Education	12		...	
Agricultural Engineering	56		29	
Agriculture	331		330	
Forestry	..		25	
		399		384
Specials—				
Agricultural Engineering	2		...	
Agriculture	12		23	
		14		23
Irregular—				
Agricultural Engineering	1		...	
Agriculture	1		3	
Forestry	1		...	
		3		3
Non-Collegiate—				
Two-Year Agriculture	224		194	
One-Year Dairy	25		36	
	249		230	

***Winter Short Courses—**						
Agronomy and Animal Husbandry	119			1,654		
Creamery Men	60			110		
Country Newspaper Men	113			...		
		292			1,764	
			1,500			2,999
3. Division of Engineering:-						
Senior Class—						
Agricultural Engineering	12			20		
Ceramics	..			1		
Chemical Engineering	1			2		
Civil Engineering	19			20		
Electrical Engineering	22			23		
Mechanical Engineering	10			23		
Mining Engineering	3			2		
Structure Design	..			2		
		67			93	
Junior Class—						
Agricultural Engineering	22			32		
Ceramics	1			3		
Chemical Engineering	..			1		
Civil Engineering	32			38		
Electrical Engineering	35			45		
Mechanical Engineering	30			36		
Mining Engineering	4			...		
Structure Design	..			5		
		124			160	
Sophomore Class—						
Agricultural Engineering	40			23		
Ceramics	2			1		
Chemical Engineering	1			14		
Civil Engineering	47			50		
Electrical Engineering	58			64		
Mechanical Engineering	44			46		
Mining Engineering	..			3		
Structure Design	2			10		
		194			211	
Freshman Class—						
Agricultural Engineering	56			29		
Ceramics	1			4		
Chemical Engineering	17			17		
Civil Engineering	76			52		
Electrical Engineering	101			91		
Mechanical Engineering	77			60		
Mining Engineering	3			4		
Structure Design	15			23		
		346			280	
Specials—						
Agricultural Engineering	2			...		
Civil Engineering	1			...		
Structure Design	3			1		
		6			1	
Irregulars—						
Agricultural Engineering	1			...		
Civil Engineering	..			1		
		1			1	
Non-Collegiate—						
Agricultural Engineering	3			...		
Vocational Work in Engineering	62			39		
		65			39	
Winter Short Courses—						
Engineering	27			134		
Painters	57			...		
		84			134	
			887			919

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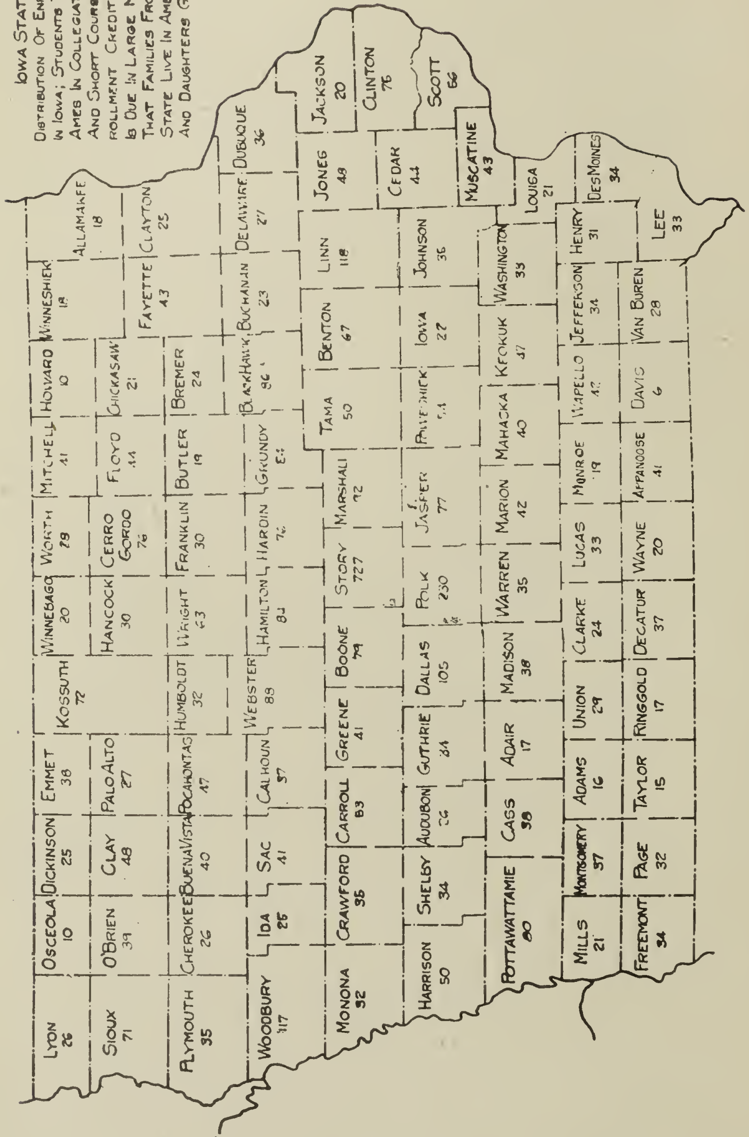
*The regular Winter Short Course was not held on account of the foot and mouth disease.

4. Division of Home Economics:						
Senior Class		67			75	
Junior Class		68			96	
Sophomore Class		139			156	
Freshman Class		240			211	
Specials		4			4	
Irregulars		3			4	
Non-Collegiate Two-Year		51			58	
Winter Short Course		22			229	
			594			833
5. Division of Industrial Science:						
Senior Class		14			13	
Junior Class		6			15	
Sophomore Class		12			25	
Freshman Class		39			45	
Specials		9			8	
Irregulars		4			4	
Music Students—						
Juniors	1					
Freshman	2					
Non-Collegiate	154			121		
		157			121	
			241			231
6. Division of Veterinary Medicine:						
Senior Class		16			11	
Junior Class		11			20	
Sophomore Class		20			30	
Freshman Class		34			47	
Irregular					1	
			81			109
7. Summer School:			601			1,055
Total			3,973			6,249
Less Duplicates:						
Agricultural Engineering		136			104	
Animal Husbandry and Veterinary Medicine					1	
Industrial Science and Veterinary Medicine					3	
Non-Collegiate Music		92			81	
Summer Session—						
In both sessions				163		
Regular college students		116		233		
					396	
Winter Short Courses—						
In two sessions				33		
Regular college students				129		
					162	
			344			747
			3,629			5,502



Iowa State College

Distribution Of Enrollment By Counties In Iowa; Students Taking Instruction At Ames In Collegiate, Non-collegiate, And Short Courses, 1915-16. The Enrollment Credited To Story County Is Due In Large Measure To The Fact That Families From All Parts Of The State Live In Ames While Their Sons And Daughters Go Through College.

22411

The graphic on the adjoining page shows the student enrollment by counties for the year 1915-16, all classes of students, including those in attendance at the Winter Short Course, being considered. The number from Story County, in which county Ames is located, is large because a large number of parents come to Ames to live while their children are attending college.

The table of attendance shows that the enrollment of students in four-year agricultural courses in 1915-16 was more than double that of six years ago. This is the natural result of the increasing interest in agriculture and agricultural education. The enrollment in home economics in 1915-16 was more than four times that of six years ago. This remarkable increase is due to the increasing interest in a subject whose application to home life is becoming more and more direct and useful; and it is also due largely to the new requirements as to training of teachers for high school work. The enrollment in engineering in 1915-16 was greater than in the preceding year and, including agricultural engineering, it exceeded that of any previous year. This is a favorable showing in comparison with the records of other institutions having large numbers of engineering students.

The work of this college, as of all land grant colleges, is related particularly to the natural resources of the country. We are coming to appreciate that the life of our country depends on these natural resources and that they must be properly used and conserved if our record is to endure. We boast that we are the richest nation in the world, but we have only recently come to realize that our wealth is merely transformed natural resources, and that our bases of supply of some of these are becoming depleted. In 1850 seven million tons of coal were mined in the United States—about the same quantity as is now mined annually in Iowa. This represented an average of .28 ton per capita. In 1902 the annual output was about three hundred million tons, and it was thought by many that we had reached the maximum, but it has risen to over five hundred million tons a year, an annual average of more than five tons per capita of population. We have been informed by the highest authorities that the end of our coal supply is within sight. We must learn to stop the enormous unnecessary waste of coal and to substitute other sources of heat, light and power. We must learn to use the water power which is now wasted.

The supply of iron, also, is decreasing rapidly. The rate of use of iron has increased tremendously during the last few decades; and, at the present rate of use and increase, the last of our best iron ore will be reached within a few decades. Here, again, there is enormous unnecessary waste which must be corrected through the aid of science, and substitutes for iron must be found and introduced.

It may be said that Iowa is not directly interested in these matters, but she is very deeply interested. Iowa uses enormous quantities of coal and iron and is as much concerned in the proper conservation of these natural resources as is Pennsylvania or Ohio.

The waste of forests is almost incredible. Because of necessity, ignorance, selfishness and wastefulness, our great supply of lumber has been reduced about one-half. The woods of Iowa are vitally concerned. The farmers of this state use annually 25,000,000 fence posts, enough to build a fence line as long as three times around the earth at the equator. Men of science must determine and teach how to lessen the waste of lumber, how to secure more lumber without increasing the forest or woods area, how to find substitutes for lumber, how to protect it from pests and destroying processes and how to utilize its by-products. Our country must experience a profound change in its attitude toward the woods and forests, for they have to do with climate, temperature, water storage, floods, and soil fertility, as well as furnishing an invaluable commercial product.

The greatest natural resource of all is soil fertility. After a short period of a century and a half, we must now look with shame on large areas where the soil fertility has been depleted to the point where it is difficult to grow good crops. Our record-breaking yields of agricultural products are carrying away plant food which long has been in Iowa soils. We point to other states where continued cropping has seriously depleted the soil fertility, but the same process is taking place in Iowa. It is for men scientifically trained to teach systems of farm management which will avoid such losses. President Van Hise states that the problem of restoring our infertile soils is the most fundamental, the most far-reaching, and the most important of the problems of conservation which confront the nation; and he emphasizes the fact that this problem must be worked out and that this can be done only through investigation and education. We suffer heavily, also, on account of pests which attack the crops and animals in process of growth and after maturity. These pests come in ever increasing numbers. Animal diseases take a toll of nearly one million dollars daily in the United States. The average losses on this account in Iowa amount to about two and one-half million dollars a month. The greater the population, the more we must contend against such losses, and the only weapon known is the application of science to practice.

Another resource which deserves to be classed with the natural resources is our home life. Its problems are not less intricate than the problems of soil fertility and coal and iron. Our national welfare and spirit depend largely upon the character of the homes. To make the homes healthy and attractive, to provide food that is wholesome and economical, to instruct young women in the fundamentals of home life and to teach them so that they may give this instruction to others,—these things are included with the responsibilities toward the natural resources as the great function of the land grant college. That the people are coming to realize these facts more and more is shown by the increasing attendance at land grant colleges.

EFFICIENCY LECTURES.

The innovation of efficiency lectures for all freshman students has proved to be valuable, and these lectures are being continued. Many new students do not know how to study. They cannot concentrate their attention upon their lessons. Frequently the students themselves are most keenly aware of this fact and most anxious to overcome it. To assist them a course of efficiency lectures is given in the first semester of each year. In the fall of 1914 and the fall of 1915 these lectures and the speakers were:

Fall 1914.

September 22—Student Economics. By President Pearson.
September 29—College Spirit. By Mrs. S. A. Stevenson, of Iowa City.
October 26—Student Habits. By Rev. Howland Hanson, of Des Moines.
October 27—Student Hygiene. By Dr. C. G. Lang.
November 10—Disease Carriers. By Dean R. E. Buchanan.

Fall 1915.

September 21—Student Economics. By President Pearson.
October 5—I. S. C. Efficiency Ideals. By Dean E. W. Stanton.
October 19—College Spirit. By Mrs. Anna Burdick, of Des Moines.
November 2—Disease Carriers. By Dean R. E. Buchanan.
November 16—Sex Hygiene. By Dr. F. N. Seerley, of Springfield, Mass.

LECTURES OF GENERAL INTEREST.

The Board of Education believes that students taking technical courses should have opportunity to hear lectures on topics of general and timely interest, and for this purpose appropriated $600 annually during the biennium. The following lectures were given under this arrangement:

Year 1914-1915.

October 23—William Bruce Leffingwell. Illustrated Lecture, "The Pacific Northwest."

November 3—Zona Gale, Portage, Wisconsin. Reading, "Exit Charity," a "Friendship Village" story.

November 21—Dr. Woods Hutchinson, New York City, "Foods and Foolishness."

December 14—Katherine Jewell Everts. Lecture-Reading.

March 9—Prof. Edward B. T. Spencer, Grinnell College. Illustrated Lecture, "Cliff Dwellings of the Mesa Verde of Southwest Colorado."

April 6—Fred J. Lazell, Cedar Rapids. "The Pageant of the Year."

April 20—Dr. Graham Taylor of Chicago Commons. "Mobilization for Peace Suggested by War."

April 27—President George E. Vincent, University of Minnesota. Convocation Address, "An Ancient Dream."

May 4—Professor G. W. Stewart, State University of Iowa. "Some Recent Conquests in Physics."

Year 1915-1916.

October 12—Dr. Henry S. Curtis, Olivet, Michigan. "The Play Movement and Its Significance."

October 26—Gilbert McClurg, Colorado Springs, Colorado. Illustrated Lecture, "Empire of Peak, Park, Pass, and Plain."

November 4—Dr. Jenkin Lloyd Jones, Lincoln Center, Chicago. "Who Are the Cultured?"

November 19—Dr. Harry W. Laidler, New York City. "War and Socialism."

February 14—Mary Antin, New York. "The Meaning of Americanism."

March 23, 24, 25—Ex-President William Howard Taft, Kent Professor of Law in Yale University. "Our World Relations," "The Military and Naval Defenses of the United States," "The Duties of Citizenship."

March 29—G. Lowes Dickinson, Lecturer and Fellow of King's College, Cambridge University, England. "International Reconstruction After the War."

April 8—Prof. S. H. Clark. "King Lear."

April 11—Prof. W. S. Franklin, Professor of Physics, Lehigh University, South Bethlehem, Pa. "Bill's School and Mine."

April 28—Prof. E. B. T. Spencer, Grinnell College. "A Month in and Around Rome."

April 28—Dr. Max Witte, State Hospital for the Insane, Clarinda, Iowa.

ORGANIZATIONS.

The students have many organizations of their own, including technical societies, literary societies, fraternities, sororities, the Y. M. C. A. and Y. W. C. A., and general organizations.

The college long has had a rule covering eligibility to fraternities and sororities. It is as follows:

> All students who join fraternities must be at least entitled to sophomore classification with neither a condition nor a not pass in any freshman work, and have an average of 82.50 or above.
>
> Any student having a low average grade during his freshman year due distinctly to illness may be initiated at the end of his Sophomore year provided his average grade for his sophomore work is 82.50.
>
> Any student before being initiated must obtain from the Registrar a written permit showing that he has met the above conditions.

Some objection has been raised to this rule on the ground that it discriminates against the fraternities, but the faculty has felt that it is fair and in the interest of the organizations as well as the college as a whole and has not been disposed to modify the requirements. This view is held, also, by prominent fraternity members, including alumni.

RELIGIOUS LIFE.

The great majority of students in this college have been reared in Christian homes and very many of them are church members. When students first register they are requested to state the church of their membership or preference. The following data have been collected for the last year of the biennium:

Armenian	1
Baptist	162
Catholic	142
Christian	193
Christian Science	20
Congregational	360
Dunkard	2
Episcopalian	73
Evangelical	6
Jewish	4
Lutheran	132
Methodist	892
Mormon	10
Presbyterian	467
Quaker	18
Reformed	4
United Brethren	27
Unitarian	13
Universalist	6
Christadelphian	1
No preference given	345
Total	2,878

The whole college community has been fortunate in the opportunity to hear the strong speakers, representing different religious denominations, who have appeared at the Sunday morning chapel services. These services have been well attended. Often the hall, with a seating capacity of nearly 900, has been overcrowded and those coming late have been kept out. The names of speakers at the chapel are given under College Functions.

The Y. M. C. A. and Y. W. C. A. continue to do excellent work. They are both newly officered and they are responding to the many demands made upon them. These helpful organizations should have larger and better quarters than can be afforded in the limited space at Alumni Hall.

A large number of students attend the Ames churches, and some take out membership during their residence here. The student pastors deserve special mention because of their helpful work.

ROOMING FACILITIES.

Although many new houses have been built in Ames and in the vicinity of the college, an overcrowded condition obtains in reference to rooms for students. Rooms are in such demand that the college has not found it possible to exercise supervision sufficient to exclude rooms which are not suitable for student quarters. The construction of another new dormitory for young women students has proved a great relief. The young ladies and their parents particularly appreciate the well lighted and well located rooms, together with wholesome meals, all of which are under the supervision of the college. Additional dormitories are greatly needed.

RELATIONS BETWEEN LOWER CLASSES.

The action of the Class of 1916, in its Sophomore year, which reversed the traditional attitude between sophomore and freshman classes, changing it from antagonism to friendliness, has borne good fruit. Efforts are being made to develop friendly relations between the lower classes so that this may become a fixed tradition of the college.

The following resolutions passed by the Class of 1918 in the Fall of 1914, when Freshmen, expressing appreciation of the cordial treatment extended to them by the Class of 1917, and the resolutions passed by this same class in the spring of 1915, agreeing to extend similar courtesies to the incoming class in the Fall of 1915, indicate the progress that has been made in this direction:

RESOLUTIONS PASSED BY THE FRESHMEN CLASS, FALL 1914.

Whereas, The Class of 1917 has expressed itself in favor of friendly relations with our class, by having a committee of their class meet and extend a cordial welcome to members of our class who arrived in Ames as strangers, and assist us in finding rooms, and otherwise;

And Whereas, The whole college has made it as easy and as pleasant as possible for us, thus continuing toward the entering class a policy that was started at Iowa State College one year ago;

Therefore, Be It Resolved, That this Class of 1918 hereby expresses its special appreciation to the Class of 1917 and its thanks to all who have assisted us, and also expresses its desire to continue friendly relations with the upper classes and our purpose to continue and emphasize this new policy toward those who enter in next year's class.

Sept., 1914. C. R. Farmer, *President.*

RESOLUTIONS PASSED BY THE FRESHMEN CLASS, SPRING 1915.

Whereas, The Classes of 1916 and 1917 having adopted resolutions of friendliness and helpfulness toward the members of the Class of 1918; and,

Whereas, These resolutions having been faithfully adhered to; and,

Whereas, We, the Class of 1918, having enjoyed the most cordial treatment can do no more than further this noble policy toward the classes to follow,

Therefore, Be It Resolved, That this Class of 1918 express its appreciation and thanks to the Class of 1917. Also, that we, the Class of 1918, shall do all in our power to establish this custom of friendliness between sophomores and freshmen in Iowa State College; furthermore, a committee of thirty-five (35) shall be appointed to act as a Reception Committee to the members of the Class of 1919, and to extend to them all aid possible.

Nate Bovee, *President.*
Madge Newcomer, *Secretary.*
May, 1915. Class of 1918.

STUDENT REPAIR FUND.

The board has continued to set aside $2,000 a year from the amount paid by the students as incidental fees, this fund to be drawn upon to pay for any loss of property or damage to property due to petty thefts or unnecessary breakage, and whether these losses are due to students or not. The fund of $2,000 is drawn upon to make good these losses, and at the close of the year the students are given the opportunity to determine in what way the balance should be expended in connection with improvements upon the campus or for college welfare. By thus taking the students into partnership, their interest has been increased, with the result that the kinds of losses mentioned have been reduced to a minimum; and nearly all of the fund has been available for the kind of improvements noted.

The faculty advisers and the co-operation between faculty and students through various joint committees, as described in my previous report, are being continued with good results.

SELF-SUPPORT.

A large number of our students are earning their own way, wholly or partly. They wait on table for their board and take care of furnaces and clean sidewalks, etc., for room. They do miscellaneous labor jobs by the hour. Some are trained stenographers and they find irregular work in offices. Some are agents, and others are carrying on commercial work. Occasionally the question is raised as to whether college people should be permitted to engage in commercial work in competition with persons who are giving their entire time to such work. It hardly seems that such a question could be seriously considered. If a young man is willing to do double work in order to secure an education, he ought to be encouraged in every possible way. Looking at the matter broadly, it is easy to see that society would gain nothing by preventing students from earning money in this way. If they were prevented, their alternative would be to stay out of college and go into business anyway, either here or elsewhere. Instead of saying that the students are engaged in business to the detriment of business men, might it not be better to say that some business men by doubling their efforts are securing a college education at the same time they are conducting a business? It is very noticeable that the character of young men who are willing to do double work in this way is the kind that the state of Iowa wishes to develop. The average citizens are learning more and more to co-operate, and it may be expected that in the future in this college, as in other colleges and universities, groups of students will more and more engage in commercial activities for the accommodation of their fellow students and for their own benefit in securing their education.

OCCUPATION OF GRADUATES.

In my last report, statistics were given to prove that our graduates follow the lines of work for which they are trained. Frequently the claim is made that graduates from agricultural courses do not go into farming, but the facts show the contrary.

More and more, graduates of this college are being called for to fill teaching positions, and the records often show these positions are only temporary. In a little while the young men are likely to get into their technical work, and after a few years most of the young women have become homemakers.

The faculty Appointment Committee reports that in the year 1914-15, 113 were placed in positions, 97 of this number being in Iowa. 59 entered upon positions including some phase of home economics work, and 44 entered upon positions including agriculture. In 1915-16, 120 were placed in positions, 103 of this number being in Iowa. 60 took positions including home economics work, and 49, positions including agriculture.

NAMES OF GRADUATES

The names of those receiving degrees and certificates during the biennium are as follows:

GRADUATES JANUARY 29, 1915.

Degree—Bachelor of Science in Agricultural Education.

Wilbur H. Bender
Horace B. Hawthorn
Harry Mervyn Lackie
James H. Seymour
Gilmore D. Swaney
Shirley N. McKinsey

Degree—Bachelor of Science in Agronomy.

Knute Espe
Gladys Gifford
Ernest G. Rudolph

Degree—Bachelor of Science in Animal Husbandry.

John Arthur Burgess
Austin Allyn Dowell
Arthur A. Frevert
Roger L. Hanscom
Edwin E. Hawkins
John Christian Jenson
Charles Ross King
Bert Cecil Bougher

Degree—Bachelor of Science in Forestry.

Irwin T. Bode
Harry E. Hansel
William Pollock Harley
Lowell Eben Hicks

Degree—Bachelor of Science in Agricultural Engineering.

William E. Weston

Degree—Bachelor of Science in Civil Engineering.

Ira Purdy Griffen
William A. Abram

Degree—Bachelor of Science in Electrical Engineering.

Joseph Ernest Richmond
Roscoe Schaeffer

Degree—Bachelor of Science in Home Economics.

Ina Ethel Platts

Certificate—Two Year Non-Collegiate Course in Agriculture.

Lloyd Edwin Hudson
Herbert Lane

GRADUATES, JUNE 3, 1915.

Degree—Bachelor of Science in Agricultural Education.

Ezra Colquhoun
Anthony Roy Combs
Ernest F. Cramer
William John Cromer
Enos S. Fyler
James W. Haynes
Charles Capwell Lake
Clifton C. Scott
Harvey Marshall Swift
Elmer J. Taintor
J. Verne Ellis

Degree—Bachelor of Science in Agronomy.

Clifford C. Brimmer
Charles G. Johnson
Raul D. Gonzalez
John Milford Raeder
Richard Wesley Reep
Roy Olin Westley
Charles Williams Clarke
Paul Macy Wolf
George Edward Corson
John C. Eldredge
Adlai Goldschmidt
Fred A. Koenig
George Harlan Lewis
Robert John Miller
Allan McCosh Smith
Cecil Smith
Lloyd Bertram Snyder
Stephen Creasey Thompson

Degree—Bachelor of Science in Animal Husbandry.

George W. Avery
Horace Molyneaux Clark
Rollin B. Berry
Ralph Wilson Berry
Frank Horace Bliss
John Harrison Swan
George J. Blythe
Henry Oliver Schloeman
Chester A. Bonnewell
Allen G. Thurman
Lew Parks Reeve
William J. Breakenridge
Henry Alexander Dobbin
Henry C. Burnstedt
O. M. Camburn
Neal Dow Campbell
Jesse Murray Dowell
Earle Edwards
Allen Thurston Flint
Frank Elmer Fox
Gale K. Frink
Owen Alvin Garretson
Homer Harrison Mattison
Charles Edward Wiley
Marvin H. Hargrove
Roscoe F. Harrison
Glenn Summers
George Lewis Thompson
Joseph R. Hawkins
James D. Helmick
Roger M. Hopkins
Reuben E. E. Hubbard
Thomas Lingle
Fred Samuel Hultz
Percy E. Wood
J. Marshall Hunter
Arthur Harold Pickford
Earl Beach Krantz
Ray Seely McWhorter
Paul C. Tomlinson
Clarence R. McBride
Jean O. McClary
Sylvester George Vickerstaff
Charles B. MacDonald
Richard S. Stephenson
Kenneth McGregor
Wellington Scott McMahon
Rex Earl Yockey
Charles O. Meltzer
Worth William Merritt
Brown **Cheney Woodbury**
Harold Franklin Miller
Robert Hart True
Van David Peterson
Paul Birch Paxson
Elbridge Gerry Potter
John Lyman Van Anda
Robert Paul Warden
Burton Fonda Stacy
Hugh B. Woodroffe
Harold Franklin Wise

Degree—Bachelor of Science in Dairying.

Edward S. Bittman
Glenn H. Campbell
Harrison Betts Wilson
Emery Fox Goss
Norman Everett Olson
Joseph Clarence Wenger
E. A. Seiler
Theodore Thorson

Degree—Bachelor of Science 'n Dairying—Continued

Chester Allen Goss
Arthur D. Henss
J. F. Thomas
Elgin Stanley Warren
Ardo Wayne Joy

Degree—Bachelor of Science in Horticulture.

John Hampden Allison
Frank Hainer Beach
Robert Myron Clark
Albert James Diserens
Roland Stewart Hoyt
S. G. Lake

Degree—Bachelor of Science in Forestry.

Harley H. Sage
Robert Porter Smith

Degree—Bachelor of Science in Agricultural Engineering.

Charles Ralph Armour
Deane G. Carter
Arthur W. Clyde
Leonard J. Fletcher
O. Dean Davidson
Floyd G. Hodsdon
Delbert Valentine Gordon
H. Harold Sunderlin
Henry Eugene Josselyn
Ralph E. McConnell
George Dalton McMahon
Bertice Raymond Mullen
Silas Drew Snyder
Glen W. Johnson

Degree—Bachelor of Science in Chemical Engineering.

Edwin F. Barnum

Degree—Bachelor of Science in Civil Engineering.

Fredric Horace Anthony
Charles Alton Baughman
Paul Marshall Black
Frederick Cooper Schneider
Charlie B. Grover
William Irvine Cool
Charles Lloyd Minnis
Chester **W. Cunningham**
Sidney W. Gaylord
Harry A. Walker
Raymond L. Dickinson
John Nash Mac Vicar
Vaughn Worthington Enslow
Merle Everette Johnson
Elmer Lawrence Kaser
David H. Gilchrist
Homer A. Sears
Stough A. McGavern
Howard Orr Graham
William MacGregor MacGibbon
Thomas R. Perry
Carl Y. Sernstrom
Vincent M. Reese
Van Stuart Walker

Degree—Bachelor of Science in Electrical Engineering.

Earl Granville Anderson
Elmer Godown
Peter C. Jansen
Bayard C. Bangham
Thearl D. Essig
Edward Clarence Seeds
Clarence Albert Butcher
Gates Harpel
John Dockendorf
Oliver Morgan Peaslee
Albert E. Dudley
Hugh A. Scarborough
Theodore V. Houser
Marion Martin Kenneally
Willis Fenton Hudson
Clarence Franklin Nagle
Milton W. Shupe
A. E. Lee
G. T. Pearce

Degree—Bachelor of Science in Mechanical Engineering.

Theodore Aulmann
C. W. Beese
Robert Jackson Horne
O. Dean Davidson
Paul Woodard Eells
Alfred Claire Gunsaulus
Frank Henry Hunefeld
H. C. Stuckenbruck

Degree—Bachelor of Science in Mining Engineering.

Guy Horton
Charles Orville Simpson
Charles C. Stevens

Degree—Bachelor of Science in Home Economics.

Grace Hill Allen
Ruth Avery
Etta Barnhart
Constance Beardshear
Edith Clara Bliss
Edith Daisy Brownell
Mary Louise Buchanan
Beula Buffington
E. Gladys Cessna
Hazel Cessna
Lucy Sheldon Clark
Edith F. Cole
Jessie V. Coles
Ruth Conrad
Elsie Mae Cretsinger
Anna M. Deacon
Margaret Noble Deischer
Martha Dew
Isabel Dyer
Sarah M. Field
Edna Belle Frye
Genevieve Eunice Furry
Mariel Hopkins
Mabel Jeannette Helmick
Valona Florida Helmick
Florence Mae Holm
Mae Irvine
Flossie Mae Lewis
Vivian Adele Linse
Luella E. Madson
Amy L. Middleton
Mary E. Montgomery
Mabel Vesta Murphy
Ruth McClintock
Leone McGhee
Mabel McGowan
Winifred McHose
Doris Marie Pammel
Laura Eliza Parks
Louise Peck
Margaret Anne Penick
Eunice R. Peters
Wilma Atherton Phillips
Jessie Laurine Pierce
Jeanette M. Prusia
Myra Riggs Reeve
Irene Ringheim
Mary E. Roberts
Marie A. J. Rudnick
Ada Claire Ryan
Abigail E. Shumway
Clara Belle Steen
Lottie E. Ward
Marion Wentworth
Jennie L. Iverson
Marie Johnson
Mary Clara Kelly
Majorie Ketchum
Leone Clarice King
Gratia C. Kinney
Bertha E. Lamson
Mary E. Lemley
Mary White
Annie Faye Wilson
Hortense Elizabeth Wind
Ethel H. York
Bess Watson
Emma Lou Wilson
Clarice Vincent Horton

Degree—Bachelor of Science.

Winifred Perry
George P. Pritchett
Orville Carl Schultz
Ira W. Bouck
Elizabeth Barbara Canaday
Harold E. Carlson
Mabel Berde Field
Muriel Kathryn Griggs
Earl Albon Hewitt
George A. Minges
Laura Niles
Nellie L. Noble
Mildred Margaret O'Connor
Julius H. Peters
Olive Mae Stewart
Florence Sarah Willey
Floyd Wambeam

Degree—Doctor of Veterinary Medicine.

Norman W. Ackerman
Newton Rutherford Allen
Raymond Hurlbut Aull
Edmund Burke
Chauncey Collins
Oness Harry Dixon, Jr.
Alva Lybarger Howard
Edwin Emmett Hites
Charles William Likely
John Meredith Lloyd
Harold L. McMillan
Mac Leo McLaughlin
Homer Samuel Perdue
Laurens Day Potter
Loron Ray Potter
Earl Raymond Truax

Degree—Master of Science in Agronomy.

Franklin Elmer Allison
Louis Joseph Henrich
Herwegh Joseph Lechner
Francis Edward Longmire
William Westley Stanfield
Franklin Scott Wilkins
Ross Leon Bancroft
Thomas Harold Benton
Eric Eyre Eastman
Harlan Woodbridge Johnson
Lyle Jay Pletcher
Elbert Bruner Reynolds

Degree—Master of Science in Animal Husbandry.

J. C. Cort
G. Ward Goodrich
A. C. McCandlish
Aubrey J. Swift

Degree—Master of Science in Dairying.

Mogens R. Tolstrup

Degree—Master of Science in Home Economics.

Zelma Zentmire

Degree—Master of Science.

Helen Alice Burling
Frederick Eberson
H. S. Coe
William Diehl
Hiram Smoots Doty
John Hall Buchanan
Horace B. Hawthorn
John Howden Fraser
George A. Williams
Robt. Harkness Hix

HONORARY DEGREES.

Degree—Doctor of Veterinary Medicine.

Marion Dorset, B. S., University of Tennessee, 1893, and M. D., Columbian University, D. C., 1896.

Degree—Doctor of Engineering.

La Verne W. Noyes

CERTIFICATES OF EMINENT SERVICE.

Honorable W. D. Hoard, Fort Atkinson, Wisconsin.
Mr. Charles G. Patten, Charles City, Iowa.

PROFESSIONAL DEGREES.

Degree—Master of Agriculture.

Merritt Greene
Evan L. Morris
Martin Luther Mosher

Degree—Agricultural Engineer.

Daniels Scoates

Degree—Ceramic Engineer.

Milton F. Beecher

Degree—Civil Engineer.

Eugene H. Bruntlett
Harry Kimball Davis
Arthur Garfield Hall
Roland Schannel Wallis

Degree—Electrical Engineer.

Lyle H. Corlette
Arthur Henry Hoffman

Degree—Mechanical Engineer.

Arthur Charles Bullen
Herbert W. Wagner

MUSIC DIPLOMA.

Gladys Garton
Florence Luceil Key

Certificates—Two Year Collegiate Agriculture.

George Dennison Artley
John Thomas Ashford
George Edward Fahey
Hilman Otto Gaarder
Delmar Davis Latham
Maurice Harry Manning
Lewis Francis Rogers
Robert Gayle White

Certificates—Two Year Non-Collegiate Agriculture.

Walter Edward Anderson
P. Edgar Applegate
Sylvester Austin
Henry Bakke
James M. Bolon
Joseph H. Bradford
Harold James Calvin
Ralph H. Crawford
Joshua Otto Gidel
C. R. Gochnour
Roscoe Stewart Gordon
Arthur C. Hanson
Harold M. Harter
Loring Thomas Hardy
Ralph S. Henry
Henry Oliver Hill
Milo C. Holck
Karl L. Kading
Lloyd E. Hudson
Ben W. Kelleher
Ralph W. Klopping
Herbert C. Lane
Harry Moorehead Laurance
Francis Gale McClean
Clair A. McCorkell
J. Howard McCurry
Albert Everett Newquist
Edwin M. Osborn
Carl George Phelps
Cecil A. Plato
George Gould Platt
Bruce M. Reed
Glen H. Sorden
Edward L. Steele
Russell James Teachout
Charles Thompson
Guy Edwin Toyne
Glenn O. Turner
Fred R. Walker
Lloyd P. Way
Frank E. Wilson

Certificates—Two Year Non-Collegiate Home Economics.

Edith Christy
Geraldine Maude Gillespie
Clara Beryl Kenyon
Grace Viola Trailer
Carrie Walter

Certificates—Two Year Non-Collegiate Vocational Engineering.

Edward E. Hogeland
Stephen W. O'Brien
Hugh Shellabarger

GRADUATES, JANUARY 28, 1916.

Degree—Bachelor of Science in Agricultural Education.

Carl B. Wilson

Degree—Bachelor of Science in Agronomy.

Charl Louis Roux de Wet
Sigurd Hansen
Paul Charles Pownall
Harold Worthington Turpin

Degree—Bachelor of Science in Animal Husbandry.

Lawrence E. Dool
Lorne T. Earl
Lee A. Kellogg
Lysle Wayne Renne
Milton Harrison Scott
Elmer V. Walter

Degree—Bachelor of Science in Horticulture.

Young Bing Li

Degree—Bachelor of Science in Agricultural Engineering.

Ralph L. Patty

Degree—Bachelor of Science in Civil Engineering.

Ray Elbert McCurdy

Degree—Bachelor of Science in Home Economics.

Mary Ruth Little

Certificate—Two Year Non-Collegiate Course in Agriculture.

Carl C. Bonnicksen
Adelbert H. Hanna
Harold Green McGee
Jay Russell Melick
Clarence John Hugo Nus

GRADUATES, JUNE 8, 1916.

Degree—Bachelor of Science in Agricultural Education.

William Ferris Cramer
Vernon Clay Gibson
Herbert M. Hamlin
Tura Alice Hawk
Raymond Charles Kelly
John E. Merrill
Claude C. Minteer
E. Norman Norland
Charlie H. Obye
Merlin L. Seder
Andrew N. Smith
William Wesley Stanfield
Herbert B. Swanson
Alfred Churchill Wilcox

Degree—Bachelor of Science in Agronomy.

Guy H. Atwood
O. Russell Bentley
Robert H. Birlingmair
George Franklin Booker
Robert Gauvain Cambre
William Ferris Cramer
Russell C. Gibbs
Will S. Gregg
E. G. Hayward
John Albert Hendriks
Leslie M. Hurt
J. Carl Johnston
Clarke Johnston
Harry Arthur Karr
Francis R. Kerrigan
Nile Clark Kinnick
John Horace Kraft
Charles S. Lamson
Alexander James Levi
Harral A. Longworth
Reid Blaine Lyford
Floyd E. McCray
Cecil Eugene McDonald
William T. Maakestad
Emil J. Mildenstein
LuVerne Merton Mathewson
Marshall P. Miller
Alexander Robert Moffat
Arthur R. Pearson
Henry R. Richardson
Lester Shepard
Edward D. Shivers
Hans Edward Skott
John B. Smith
John Daniel Swiney
A. O. Syverud
Hector Velez Otero
Scott Alan Walker
Jay Whitson

Degree—Bachelor of Science in Animal Husbandry.

Ira W. Arthur
Henry Page Aydlette
Franklin Fisk Barker
Walker Crookham Beach
Raymond B. Becker
Charles Millard Bilderback
Dea Jonathan Brasted
Andrew James Brown
Fred V. Brownell
Nathaniel Charles Burhans
Fred F. Clark
Jay William Clayton
Lloyd Garrison Crouch
Howard P. Dunlap
Ralph Marshall Edwards
Clair Gladstone Mason
Ralph Hart Moyer
David A. Noble, Jr.
Robert M. Okey
Leslie L. Parsons
John Sigwalt Porterfield
H. Earl Rath
Thomas Humphrey Roberts
Vincent Bradley Rodgers
Edward Ruesink
John L. Shugart
Day E. Slingerland
Andrew N. Smith
Edgar S. Smith
F. Lee Stewart

Degree—Bachelor of Science in Animal Husbandry—Continued

J. Parvin Eves
John Carleton Galloway
Harry C. Handy
Mark Gordon Hazard
James Oscar Hodgson
Russell Merton Holbrook
Millard Fillmore Jackson
W. Deweese Johnson
Robert James McCausland
Harold Lyman McKinley
Hugh G. McTavish
Erich F. Stuewe
J. Clen Tallman
William Murdock Temple
Merton George Thomas
Elling Martin Torblaa
Fred Raymond Tucker
Otis Harrison Tuttle
Carmi Huston Van Anda
James Jackson Wallace
Charles Leffingwell Walp
Harold Julian Williams
Harry Burdett Winchester

Degree—Bachelor of Science in Dairying.

John Dent Arnold
Fred G. Bliss
Joe M. Eldridge
William A. Gordon
Arthur James Gude, Jr.
Robert C. Hibben
Robert Wallace Leffler
Albert Walter Reynolds
Edward G. Squire
Omar M. Strickler
Carl Arthur Vorhes

Degree—Bachelor of Science in Horticulture.

Arthur Hawthorne Carhart
Bernard B. Jones
Ellwood Jackson Meeteer
George Grigsby Moore
Glenn Marsh Smith
Irvin H. Vogel

Degree—Bachelor of Science in Forestry.

Hugh O. Cassidy
Harvey H. Cornell
Max Geisler
Glenn Charles Jones
Carrell C. McCarthy
Homer H. Plagge
Newton O. Plagge
William Raymond Rumbaugh

Degree—Bachelor of Science in Agricultural Engineering.

Howard Bertrand Bliss
Wilbur Drake
Carl Victor Englund
W. H. Farmer
Bennie Evelyn Gaylord
Martin H. Goede
Harry Hall
Frederick William Hawthorn
Verne William McClung
Elmer Leroy Merten
Howard E. Middleton
Richard C. J. Miller
Ralph E. Patterson
Ward Peterson
Merle Kenneth Reed
Earl W. Smith
Theodore Addis Toenjes
Edwin James Uhl
Justino Valdes y Jimenez
Melvin R. Watson
Alfred Reynold Williams
John Conrad Zimmerman

Degree—Bachelor of Science in Ceramics.

Osgood J. Whittemore

Degree—Bachelor of Science in Chemical Engineering.

Raymond S. McMullin
Harold Peregoy Roberts

Degree—Bachelor of Science in Civil Engineering.

Ralph J. Boomer
James Neal Cook
Robert Park Cordiner
William S. Cordiner
Harlan Belden Crane
Ralph James Freshour
Wm. Mortensen
Mont C. Noble
Harry Wood Phelps
Waldo Justin B. Porter
Paul Wayne Riedesel
Fred D. Smith

Degree—Bachelor of Science in Civil Engineering—Continued

Peter Francis Hopkins
George Stanley Huxtable
Wayne Allen Kivell
Tauge Frederick Matson
Alexis Erling Stoddard
Robert Thornburg Summers
Homer D. Susong
John M. Tippie
Ellsworth Young

Degree—Bachelor of Science in Electrical Engineering.

Harold Bruce Alden
George Eduard Beck
James Donald Benson
James E. Blake
Ralph A. Brady
Donald Lloyd Bruner
Percival John Burrill
Abner Ignatius Butler
Horace Wayne Cash
Harold Louis De Bar
Paul F. Gregg
Frank H. Hollister
Clarence Knapp Hood
Harold Austin Hoyt
Ivan Matthew Kirk
John J. Lamberty
Sebastian Joseph Landman
Edward K. Lewison
Homer Claude Meeker
John Bernard O'Rourke
Harry Vincent Parle
Joseph Byron Rawlings
Bruce Allison Rogers
Leon Arthur Winter

Degree—Bachelor of Science in Mechanical Engineering.

Robert Adam Althaus
John Paul Anderson
Edward Ernest Axthelm
Arthur Harl Boileau
Jerimiah Joseph Boltz
Harold N. Conrad
Ellis E. Covey
Willis Edmund Dexter
Russell Theodore Edwards
Harry Lewis Hilleary
Burt Eldon Hoover
Edward Thayer John
Earl Harry Kimball
Ralph Hull Kirk
Richard Cavanaugh McElroy
Paul Willard Pittman
I. L. Rush
Willard E. Russell
William August Thiel
Robert Merrill Woodworth
James Arthur Yungclas

Degree—Bachelor of Science in Mining Engineering.

John Brainard Fidlar
Fred W. Strandberg

Degree—Bachelor of Science in Structure Design.

Grant C. Caywood
Lewis E. Richardson

Degree—Bachelor of Science in Home Economics.

Ida V. Ahrens
Ida Adelaide Anders
Emma A. Baie
Adela Frances Bakewell
Sadie E. Barnhart
Helen Bass
Julia Ella Brekke
Estella Buffington
Eleanor Elizabeth Burnquist
Ella Laura Bussey
Ada Anne Cameron
Gladys S. Carson
Eva Lila Cox
Cecile Crittenden
Ruth Curtiss
Georgia Bernice Davis
Mary Helen Divine
Grace Howland Dewey
Eleanora Grace Herner
Ethel M. Hutton
Ava Louisa Johnson
Cora B. Johnson
Zoa Mary Keating
Rachel Knupp
Caroline C. Kriege
Lydia Eva Lacey
Beth Lemen
Maude Elizabeth Lewis
J. Myrl Lillard
Marjorie McCoy
Clara Gertrude Manhardt
Mina Mae Mulky
Alice Marion Peek
Lois Myrtle Rath
Alma Riemenschneider
Helen Rodgers

Degree—Bachelor of Science in Home Economics—Continued

Lenore Dunnigan
Lilian R. Eddy
Ruth English
Mary M. Forman
Lorraine Graham
Lula Gray
Ora M. Griffith
Hazel A. Grimes
Gladys Neville Hardy
Mary Elizabeth Harrington
Margaret Bertha Harris
Anna E. Hartmann
Nelle Harvey
Tura Alice Hawk
Linda Marie Heise
Diveda Henderson
Merle Ross
Madge Claire Ryan
Marjorie Sims
Ruth Agnes Somers
Margaret Barrette Stewart
Fern Stover
Margaret Taake
Ferne Taylor
Dessie Amber Walker
Florence Watkins
Eleanor Wilson
Eva Rose Wilson
Vera Wingerson
Clara Bell Woodroffe
Nora Workman
Marjorie Wyckoff
Marie Dorothy Young

Degree—Bachelor of Science.

Ward C. Bean
Beryl Berenice Benge
Ruby Leatha Donohue
Pauline A. Flint
Laura Drucilla Frick
Harriet May Kintzley
Rush Blodget Lincoln
Ralph Albert Moye
Esther Helen Rebok
Howard L. Sunderlin
Vivian Vertrees

Degree—Bachelor of Science in Bacteriology.

John C. Weldin

Degree—Bachelor of Science in Chemistry.

Joseph Wm. Hawks
Ava Louisa Johnson
Norville Clarence Pervier

Degree—Doctor of Veterinary Medicine.

Ernest L. Fitch
Lloyd William Fox
Albert B. Haskins
Harry J. Juzek
Tedmar M. Rossing
Ernest W. Smillie
Richard Elmer Surring
Robert Stanton Tillie
Orville Robert Whitney

Degree—Doctor of Philosophy.

Leslie Alva Kenoyer

Degree—Master of Science in Agronomy.

William Edgar Bowers
Washington Irving Brockson
George Edward Corson
Ernest Bernard Hitchcock
Ove Frederick Jensen
John Anthony Krall
Marion Elias Olson
Frederick Stanley Reynolds

Degree—Master of Science in Animal Husbandry.

Marvin Treadwell Aldrich
Dick Roy Forrester
James Edward Harper
Maurice D. Helser
Evan Liston Jenkins
James Richard Quesenberry
Louis Sawyer
Richard S. Stephenson

Degree—Master of Science in Dairying.

Wilbert A. J. Baril
Vincent D. Chappell
Nick Fennema
Emery Fox Goss

Degree—Master of Science in Farm Management.

Robert Jens Leth

Degree—Master of Science in Horticulture.

Leonard Ramsden Hartill
Withrow Reynolds Legge
Frederick L. Overley
Robert Lewis Post

Degree—Master of Science in Ceramics.

Martin Grover Babcock

Degree—Master of Science in Bacteriology.

George Gorham DeBord
Beryle Raymond Johnson

Degree—Master of Science in Botany.

Jacob Peter Anderson
J. L. Seal

Degree—Master of Science in Chemistry.

Myron Sallee Anderson
Sue Elizabeth Bailey More

Degree—Master of Science in Economic Science.

Charlotte Dryden
Gladys Porter
Olive Stewart
True G. Watson

Degree—Master of Science in Geology.

Frank Bonar Howe

Degree—Master of Science in Mathematics.

Grace Campbell
Mary B. Miller

Degree—Master of Science in Zoology.

Cecil Coyne Knoblock

PROFESSIONAL DEGREES.

Degree—Master of Agriculture.

Wayne Dinsmore
Charles Gray

Degree—Civil Engineer.

Charles Alton Baughman
Paul C. Campbell
Charles Dwight Curtiss
Rex E. Edgecomb
Claude Irving Grimm
Conde Balcom McCullough
William John Thomas
David Leroy Yarnell
Harley J. Gould

Degree—Electrical **Engineer.**

Dirk Schregardus
Calvin Johnson Adams

Degree—Mechanical Engineer.

Nis Leerberg
Sern Madsen
Arthur L. Sanford

HONORARY DEGREES.

Degree—Doctor **of Science.**

Herbert Osborn
Clarence Henry Eckles

Degree—Doctor of Engineering.

Willis Whited

CERTIFICATES.

Certificate—Two Year Non-Collegiate Course in Agriculture.

Fred H. Bailey
John L. Campbell
Ernest A. Chappell
Edwin P. Davis
John J. DeValois
A. J. Dickey
Bruce Doggett
Charles E. Eiler
Clarence H. Elliott
Frank H. Enoch
James M. Flynn
Frank J. Eversman
E. D. Fraser
Gerald C. Gay
Harland J. Hillman
Laurens Jeffers
Herman Koch
Roy M. Koster
Ralph H. Lamoree
Roy S. Littlefield
Paul W. McCurdy
Glenn W. McNay
Arthur B. McQuern
Alfred W. Meilike
Ezra W. Meredith
Arthur H. Meyer
E. R. Moen
Allen L. Mosier
Albert G. Nelson
Howard V. Overley
Clinton P. Parker
Oscar E. Rein
Charles William Rogers
George E. Schumacher
J. C. Serup
Ora A. Seydel
Paul T. Spies
Leslie Steen
Lowell F. Teachout
W. G. Van Auken
Loyd H. Van Patten
Harry M. Webster
Russell R. Whiton

Certificate—Two Year Non-Collegiate Course in Home Economics.

Gwenifred Andrew
Blanch E. Doggett
Clare Estle
Mary E. Flanagan
Edith May Garnes
Carrie Hill
Mabel Edith Karr
Marion Lieberknecht
Dorothy Renaud
Winnie H. Walsh

Certificate—Two Year Non-Collegiate Vocational Engineering Course.

William F. Graff
L. E. Konichek

Certificate—One Year Dairying.

M. E. McMurray

The following table shows the number of degrees granted in the different courses during each year of the biennium, and total number of degrees granted up to June 30, 1916.

SUMMARY OF GRADUATES.

	1914-15	1915-16	Grand Total to June 30, 1916
Number of first degrees granted	309	334	4,044
Present Courses,			
Agricultural Education	17	15	37
Agricultural Engineering	15	23	69
Agronomy	21	43	191
Animal Husbandry	69	59	462
Ceramics	0	1	6
Chemical Engineering	1	2	5
Civil Engineering	26	22	603
Dairying	13	11	90
Electrical Engineering	21	24	425
Forestry	6	8	22
Horticulture and Forestry	0	0	51

Horticulture	6	7	18
Home Economics	70	70	268
Industrial Science	17	15	540
Mechanical Engineering	8	21	351
Mining Engineering	3	2	58
Science and Agriculture	0	0	3
Veterinary Medicine	16	9	316
Structure Design	0	2	2

Courses discontinued.

Agricultural Course, leading to Degree B. S., 1872-1880	102
Agricultural Course, leading to Degree B. S. A., 1883-1888 and 1894-1904	86
Science and Agriculture Course, leading to Degree B. S., 1889-1890 and 1909-1911	47
General Science Course for Ladies, 1872-1880 and 1904	48
General and Domestic Science Course leading to Degree of B. S., 1887-99	93
General and Domestic Science Course, leading to Degree of B. Ph., 1899-1900	21
General and Domestic Science Course, leading to Degree of B. S., 1901-1908	78
Agronomy Course, leading to Degree B. Ag., 1891-1898	50

Higher Degrees	1914-15	1915-16	Grand Total to June 30, 1916
Master of Scientific Agriculture	20	27	103
Master of Science	10	14	66
Other Master Degrees	1	0	17
Doctor of Philosophy	0	1	1
Engineers	10	15	106
Honorary Degrees	2	3	19
Vet. Med. Advanced Degrees	0	0	4

THE TEACHING STAFF.

RESIGNATIONS.

It is necessary to report an unusually large number of resignations. While some faculty members have declined propositions made to them by other institutions which offered larger salaries than were being paid at this college, a large number of professors and teachers of lower rank have been induced to leave here to accept more remunerative positions elsewhere. The resignations have been so numerous and so frequent as to seriously handicap some branches of the work. It is expected that a reasonable number of the teachers of lower rank who are qualified to fill more responsible positions will accept appointments at other institutions, but an excessive number of these changes have occurred and, still more unfortunate, teachers occupying the leading positions in their departments have been attracted elsewhere. Corresponding positions in other institutions are paying from five hundred to a thousand dollars a year more than at this college. On account of better salaries, some of our faculty members have accepted positions in high schools but most of them have gone to other colleges and universities. Frequently the increase of salary was from 25 per cent to 50 per cent over what was being paid here, and often at these larger salaries they were given charge over a smaller number of students than they had been teaching at this college. This situation indicates the great need of better salaries which will enable the institution to attract and hold the best teaching talent. Authorities agree that an average salary of $2,000 is reasonable for many departments. At Iowa State College the average of most departments is far below this sum. One of the largest departments has an average of about $1,200.

The following resignations from the faculty occurred after the beginning of the biennium and before instruction began in the fall of 1914:

George A. Gabriel, Associate Professor of Chemical Engineering.
William B. Anderson, Associate Professor of Physics.
A. R. Hackett, Associate Professor of Physical Training.
Amos P. Potts Associate Professor of Ceramics.
George Ernest Hesse, Assistant Professor of English.

Elizabeth Moore, Assistant Professor of English.
Julia Ramsey Vaulx, Assistant Professor of English.
Arthur Taber Jones, Assistant Professor of Physics.
C. J. O'Neil, Instructor of Dairying.
Wallace Ashby, Instructor of Agricultural Engineering.
Hugo Beckmann, Instructor of Agricultural Engineering.
Jessie Mabel Hall, Instructor of Public Speaking.

The following named persons who gave instruction in either or both years of the biennium have resigned:

J. B. Davidson, Professor of Agricultural Engineering and head of department.
C. N. Arnett, Professor of Animal Husbandry.
H. H. Kildee, Professor of Dairy Husbandry.
Vina E. Clark, Librarian and Associate Professor.
Helen Monsch, Associate Professor of Home Economics.
R. H. Porter, Associate Professor of Mechanical Engineering.
Grace E. Russell, Associate Professor of Home Economics.
Ruth Michaels, Associate Professor of Home Economics.
John Ise, Associate Professor of Agricultural Economics.
S. E. Conybeare, Assistant Professor of Agricultural Journalism.
S. H. Dadisman, Assistant Professor of Agricultural Education.
O. T. Hokassen, Assistant Professor of History.
H. B. Kinney, Assistant Professor of Soils.
Grace Schermerhorn, Assistant Professor of Agricultural Education.
C. B. Williams, Assistant Professor of Agricultural Economics.
H. C. Hetzel, Assistant Professor of Horticulture.
E. W. Lehmann, Assistant Professor of Agricultural Engineering.
Jean MacKinnon, Assistant Professor of Chemistry.
Gail J. Fink, Assistant Professor of Chemistry.
Ross M. Sherwood, Assistant Professor of Poultry Husbandry.
Mabel Adams, Instructor of Home Economics.
Robert Bartholomew, Instructor of Music.
Lewis E. Bredvold, Instructor of English.
Harry James Burtis, Instructor of Public Speaking.
Grace Campbell, Instructor of Mathematics.
A. F. Carlson, Instructor of Dairying.
Jesse R. Derby, Instructor of English.
Anna M. Earhart, Instructor of English.
Elsie A. Franck, Instructor of Home Economics.
Mark Havenhill, Instructor of Agricultural Engineering.
H .C. Hubbard, Instructor of Physical Training.
A. D. Latimer, Instructor of Mathematics.
H. J. Lechner, Instructor of Farm Crops.
John Luithley, Instructor of Dairying.
Kjaerstine Mathiesen, Instructor of English.
Agnes Mosher, Instructor of Mathematics.
Mary J. Pettit, Instructor of Home Economics.
A. E. Potts, Instructor of Dairying.

Bertha M. Riley, Instructor of Home Economics.
J. L. Seal, Instructor of Botany.
Lola Stephens, Instructor of Chemistry.
Lora Thompson, Instructor of Home Economics.
E. C. Volz, Instructor of Horticulture.
Edna E. Walls, Instructor of Home Economics
R. B. Weirick, Instructor of English.
C. W. Beese, Instructor of Mechanical Engineering.
Fay Farnum, Instructor of Mathematics.
Walter Greene, Instructor of Music.
George W. Iverson, Instructor of Agricultural Engineering.
Frank J. McGrath, Instructor of Physics.
Kenneth McGregor, Instructor of Animal Husbandry.
Mary Miller, Instructor of Mathematics.
George F. Paul, Instructor of English.
John J. Reighard, Instructor of Economics.
Clara M. Williams, Instructor of Home Economics.
Elsie Mae Wilsey, Instructor of Home Economics.
H. W. Richey, Instructor of Horticulture.
J. T. Rosa, Instructor of Horticulture.
Avis Talcott, Instructor of Chemistry.
Nellie Fitzgerald, Instructor of Home Economics.
George J. Miller, Instructor of Dairying.
N. S. Golding, Instructor of Dairying.
D. E. Bailey, Assistant in Chemistry.
J. W. Bowen, Assistant in Chemistry.
R. M. Cole, Assistant in Chemistry.
John H. Fraser, Assistant in Zoology.
C. C. Kiplinger, Assistant in Chemistry.
Louis M. Larson, Assistant in Chemistry.
Lyle J. Pletcher, Assistant in Chemistry.
Gladys Rush, Assistant in the Library.
Elizabeth Sherwood, Assistant in the Library.
Irene Smith, Assistant in the Library.

DEATHS.

During the biennium there were three deaths in the instructing staff:

Charles G. Lang, Assistant Professor in the Physical Training Department.

Ernest Clay Coad, Assistant in the Agricultural Education Department.

Harriette Kellogg, Instructor in the Botany Department.

LEAVES OF ABSENCE.

Professor Henry Elijah Summers, head of the Zoology Department, has been granted leave of absence on account of illness.

Assistant Professor Chester B. Williams of the Economics Department was granted leave of absence for the year 1915-16 on account of illness. At the close of the year he resigned.

APPOINTMENTS.

Professors, Associate Professors, and Assistant Professors.

H. B. Munger, Professor of Farm Management.
R. K. Bliss, Director of Agricultural Extension and Professor.
Helen Monsch, Associate Professor of Home Economics.
Homer F. Staley, Associate Professor of Ceramics.
Allen H. Kimball, Associate Professor of Structure Design.
K. C. Ikeler, Associate Professor of Animal Husbandry.
R. A. Leavell, Associate Professor of Mechanical Engineering.
C. W. Mayser, Associate Professor of Physical Training.
W. E. Sealock, Associate Professor of Agricultural Education.
Harold Stiles, Associate Professor of Physics.
J. H. Atkinson, Assistant Professor of English.
R. R. Bolton, Assistant Professor of Veterinary Medicine.
F. H. Culley, Assistant Professor of Landscape Gardening.
S. H. Dadisman, Assistant Professor of Agricultural Education.
H. E. Ewing, Assistant Professor of Zoology.
L. B. Greenfield, Assistant Professor of English.
John Ise, Assistant Professor of Agricultural Economics.
G. E. Thompson, Assistant Professor of Physics.
Thomas F. Vance, Assistant Professor of Psychology.
Ross L. Bancroft, Assistant Professor of Soils.
Ollison Craig, Assistant Professor of Mechanical Engineering.
Gail J. Fink, Assistant Professor of Chemistry.
H. H. Gibson, Assistant Professor of Agricultural Education.
Jane A. Humphrey, Assistant Professor of Home Economics.
H. R. O'Brien, Assistant Professor of Agricultural Journalism.
R. W. Rogers, Assistant Professor of Physical Training.
Harter Walter, Assistant Professor of Physical Training.
N. L. Nelson, Assistant Professor of Veterinary Medicine.

PROMOTIONS.

Professors, Associate Professors, and Assistant Professors in Collegiate Work:

Catherine J. MacKay from Acting Dean to Dean of the Division of Home Economics.

Robert Earle Buchanan from Acting Dean to Dean of the Division of Industrial Science (In addition to other duties).

Harold Edward Bemis, appointed as Vice-Dean of the Division of Veterinary Medicine. This appointment was formerly held by Professor W. W. Dimock, but under a plan of rotating this position among the heads of departments in the division, Professor Bemis was appointed to succeed Professor Dimock.

Clare Newton Arnett, from Associate Professor to Professor of Animal Husbandry.

Percy Edgar Brown from Associate Professor to Professor of Soil Bacteriology.

Henry Herbert Kildee from Associate Professor to Professor of Animal Husbandry.

T. Radford Agg. from Associate Professor to Professor of Highway Engineering.

Allen Holmes Kimball, from Associate Professor to Professor of Structure Design.

M. F. P. Costelloe, from Associate Professor to Associate Professor and Acting Chairman of Agricultural Engineering.

C. E. Bartholomew from Assistant Professor to Associate Professor of Entomology.

James Cloyd Bowman from Assistant Professor to Associate Professor of English.

Iva. L. Brandt from Instructor to Associate Professor of Domestic Art.

George Arthur Chaney from Assistant Professor to Associate Professor of Mathematics.

Roy Winchester Crum from Assistant Professor to Associate Professor of Experimental Engineering.

Winifred Sarah Gettemy from Assistant Professor to Associate Professor of Domestic Art.

William Roy Hechler from Assistant Professor to Associate Professor of Farm Crops.

Orren Lloyd-Jones from Assistant Professor to Associate Professor of Animal Husbandry.

George Chester Morbeck from Assistant Professor to Associate Professor of Forestry.

Ernest Alanson Pattengill from Assistant Professor to Associate Professor of Mathematics.

Raemer R. Renshaw from Assistant Professor to Associate Professor of Organic Chemistry.

Fredrica Von Trice Shattuck from Assistant Professor to Associate Professor of Public Speaking and Chairman of Department.

Phineas Stevans Shearer from Assistant Professor to Associate Professor of Animal Husbandry.

Roy Eugene Smith from Assistant Professor to Associate Professor of Soils.

George Waddel Snedecor from Assistant Professor to Associate Professor of Mathematics.

Louis Agassiz Test from Assistant Professor to Associate Professor of Chemistry.

Henry William Vaughn from Assistant Professor to Associate Professor of Animal Husbandry.

George Henry Von Tungeln from Assistant Professor to Associate Professor of Rural Sociology.

John Anderson Wilkinson from Assistant Professor to Associate Professor of Physical Chemistry.

Frederick E. Colburn from Instructor to Associate Professor of Photography.

Frank H. Culley from Assistant Professor to Associate Professor of Landscape Gardening.

Genevieve Fisher from Instructor to Associate Professor of Home Economics.

Ernest M. Mervine from Assistant Professor to Associate Professor of Agricultural Engineering.

Harold Stiles from Assistant Professor to Associate Professor of Physics.

George E. Thompson from Assistant Professor to Associate Professor of Physics.

Max Levine from Instructor to Assistant Professor of Bacteriology.

John Hall Buchanan from Instructor to Assistant Professor of Chemistry.

Annie Wilson Fleming from Instructor to Assistant Professor of Mathematics.

Lester S. Gillette from Instructor to Assistant Professor of Dairy Husbandry.

Frank M. Harrington from Instructor to Assistant Professor of Horticulture.

Harry Clayton Hetzel from Instructor to Assistant Professor of Horticulture.

Emil W. Lehmann from Instructor to Assistant Professor of Agricultural Engineering.

Jean G. MacKinnon from Instructor to Assistant Professor of Chemistry.

Oscar Anton Olson from Instructor to Assistant Professor of Mechanical Engineering.

Thomas Ray Truax from Instructor to Assistant Professor of Forestry.

The number and rank of teachers of all grades in collegiate work are shown by departments for the years 1914-15 and 1915-16 in the folowing tables:

SUMMARY OF INSTRUCTION STAFF (COLLEGIATE) 1914–15 AND 1915–16,

DEPARTMENTS	Deans		Professors		Associate Professors		Assistant Professors		Instructors		Assistants		Fellows and Scholars		Total	
	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16
Agricultural Dean	1	1													1	1
Agricultural Education			1	1		1	2	2			1				4	4
Agricultural Engineering			1	1	1	2	1	1	4	4	2	1		1	9	10
Agricultural Journalism			1	1			1	1		1					2	3
Animal Husbandry			4	3	4	5		1	3	3			2	6	13	18
Bacteriology and Hygiene							1	1	1	1	1			2	3	4
Botany			1	1	1	1	1	1	4	4			1	2	8	9
Ceramics					1	1									1	1
Chemical Engineering					1			1							1	1
Chemistry			2	2	4	4		3	7	5	10	13		2	23	29
Civil Engineering			2	3	4	3	1	1	2	3	1	1			10	11
Dairying			1	1	1	1	1	1	4	4				2	7	9
Economic Science			1	1	1	2	2			1				1	4	5
Electrical Engineering			1	1	1	2	2	2							4	5
Engineering Dean	1	1													1	1
English			1	1	2	2	4	3	8	12					15	18
Farm Crops			1	1	1	1	1	1	2	3			1	2	6	8
Farm Management			1	1									1	1	2	2
Forestry			1	1	1	1		1	1						3	3
History and Psychology			1	1	1	1	2	1		1					4	4
Home Economics	1	1			4	5		1	11	12					16	19
Horticulture			1	1		1	1	2	4	3	1	1		2	7	10
Industrial Science Dean	1	1													1	1
Library					1	1			1	1	7	10			9	12
Mathematics			1	1	4	3		1	8	8					13	13
Mechanical Engineering			1	1	4	5	3	5	7	7					15	18
Military Science and Tactics			1	1	1	1									2	2
Mining Engineering and Geology			1	1	1	1	1	1							3	3
Modern Language			1	1					6	6					7	7
Music					1	1			3	2					4	3
Photography						1			1						1	1
Physical Culture							1	1	1	2					2	3
Physical Training			1	1		1	3	3	2	1					6	6
Physics			1	1		2	4	2	5	6					10	11
Public Speaking					1	1			2	2		1			3	4
Soils			2	2	1	1	1	1	1	2			1	2	6	8
Structure Design				1	1				1	1					2	2
Veterinary Medicine	1	1	3	3	2	1	1	2	1	2	2	2		3	10	14
Zoology			1	1	2	3	3	3	1	2	2	1		2	9	12
Totals	5	5	34	35	47	55	37	43	91	99	27	30	6	28	247	295

The average amount of teaching required of each member of the staff has been reduced by the addition of new teachers. It is still high as compared with leading institutions of the country, and further additions to the staff are needed to bring about a proper adjustment of the amount of work required of the average teacher in several departments.

PEDAGOGY FOR THE STAFF.

It is well known that many teachers in colleges have not themselves taken work in pedagogy or methods of teaching. This is due to the fact that institutions are obliged to appoint such teachers if their faculty positions are to be filled. To assist members of the staff, a special course of lectures was arranged for them in the fall of 1915, and these lectures proved to be both helpful and popular. Attendance was limited to members of the instructing staff. The head of our department of Agricultural Education arranged with experts to treat different phases of the subject. The speakers and their subjects in this special course included the following:

Dr. Ernest Horn of the University of Iowa. "The Problem as a Factor in Effective Teaching."

Professor W. H. Bender of the University of Minnesota. "The Problem of Reaching the Varied Motives in the Large College Class."

Dean Frank E. Thompson of the University of Colorado. "Teaching How to Study."

Dean Charles E. Fordyce of the University of Nebraska. "Factors in the Teaching Process, with Emphasis on the Presentation of Material."

Professor E. E. Lewis of the University of Iowa. "Economy in Teaching and Acquiring Motor Skills."

Professor G. M. Wilson of Iowa State College. "Are There Certain More or Less Definite Steps Which Should Appear in Every Recitation and Is It Possible to Check Up or Score Teaching According to a Definite Recitation Schedule?"

Dr. Thomas F. Vance of Iowa State College. "The Laws of Memory and Association That Are Particularly Helpful to Teachers."

Professor B. F. Pittenger of the University of Chicago. "Grading of College Students and Grading Systems."

Professor John E. Stout of Cornell College. "Good Questioning and Teaching Efficiency."

This course was provided with the aid of a special appropriation of $200 granted by the State Board of Education. Such work should be continued.

SALARIES.

It should be the aim to establish minimum salaries for the different grades of teaching service as follows:

Department heads	$3,000
Full professors	2,750
Associate professors	2,250
Assistant professors	1,600
Instructors	1,000
Assistants	800

Some of these minimum limits must be raised in the near future in order to make the positions sufficiently attractive to retain the best teachers. This is shown by the long list of resignations given above. Twelve members of the teaching staff resigned after the beginning of this biennium and before instruction began in the Fall of 1914, and seventy-two who gave instruction in either or both years of the biennium resigned, making a total of eighty-four. These resignations do not include those of fellows and scholars, who are employed only for a year. During the biennium the average number on the teaching staff, not including fellows and scholars, was 271. The resignation of 84 persons, or over 30 per cent of the staff, is excessive. It is not possible to do the best work when instructors in a department are changing so often.

The Board of Education has adopted a ruling which tends to assist in connection with the salaries. Under this rule one representative of each college teaching department is allowed to attend the one technical meeting of the most interest to the department and with railroad expenses paid by the college. These trips are authorized on recommendation of the department and approval of the president, who satisfies himself that attendance at the meeting will be directly beneficial to the department represented.

During the year 1915-16 the total expenses of such trips amounted to $1,050.51. This represents a very small average expenditure per year for the staff of teachers, being only about $3.55 per teacher.

Traveling expenses for other purposes, aside from extension work and experiment station work and hog cholera serum work, were as follows during the two years of the biennium:

To accompany classes	$ 521.08
For interviews with candidates	402.85
To buy live stock and supplies	292.64
To represent the college or station at an executive meeting	1,630.11
To study methods at other colleges and schools	47.59

Compensation for services	1,781.17
Building inspections and to consult architect	229.10
Live stock expositions and fairs	321.32
Miscellaneous	916.04
	$6,141.90

RETIRING ALLOWANCES.

This state has gone on record as desiring retiring allowances for teachers in this college. Such allowances have contributed to the efficiency of the teaching staff. As private funds do not appear to be available for retiring allowances, it is recommended that provision be made whereby a portion of the funds available for salaries may be set aside by the Board of Education for use as retiring allowances as the Board may determine. These benefits should be limited to teachers who have served long and faithfully and, to a limited extent, to their dependents.

COLLEGIATE WORK.

Instruction in this college is given along only five lines,—agriculture, engineering, home economics, industrial science, and veterinary medicine. Under the provisions of the Morrill Act, all these lines of work are clearly intended to be given. Additional lines of work are permitted, but at this college they are not included in the curriculum except to a minor extent where necessary to round out a proper education in one of the five lines mentioned. Military practice is required of all able bodied men in the lower classes.

Instruction of collegiate grade constitutes the chief duty of this college. The greater part of the students desire instruction of this grade and are classified in regular collegiate courses.

Occasionally a recommendation is heard that the standard of the instruction in this and other land-grant colleges should be lowered so as to be within the reach of a larger number of young people who wish to go into agriculture or some other industry. No step could be taken that would more quickly discredit technical education. Many an ambitious and self-respecting young man and young woman would turn away from a course of instruction which is branded as inferior in scholarship requirements and attainments, and they would accept the challenge of college courses along other lines that are rated as more difficult and of higher standard. Just such young people as these are needed in the industries for positions of leadership, and they should not be allowed to be misled, especially when it is well known that the sciences of agriculture, or the sciences of engineering, or the sciences of home making, are as difficult as any group of collegiate or university subjects. The entrance requirements and educational standards of our collegiate courses we believe to be on a par with those of leading institutions of the country.

The new plan of co-operation with the other higher educational institutions of the state put into operation by the Board of Education is bringing some good results and promises well for the future. Under this plan our college accepts students who have taken prescribed work for three years at another institution and in two more years such a student may graduate from one of our technical courses. Thus in five years' time he earns degrees from both institutions. This plan of co-operation has many advantages, especially to the smaller college and to the people of the state who wish their sons and daughters to remain as near home as possible during at least the first part of their period of college instruction.

Further steps have been taken to bring the different divisions of the college into closer relationship. Each division faculty now has regularly appointed representatives of other divisions meeting with it and enjoying full privileges in discussions and voting. The visitors are not numerous enough by themselves to control a vote. Their presence brings about a better understanding between divisions and departments, less likelihood of duplication within our own college, and more readiness on the part of one branch of the work to assist in meeting the needs of another branch.

The State Educational Board of Examiners is an important body which has to do with the certification of public school teachers, and the interests of this college are vitally and in a large way dependent upon it. It is recommended that the state law be amended so as to provide that a representative of this college may act as a member of the Board together with the presidents of the State University and the State Teachers College.

AGRICULTURE.

Instruction in agriculture is adapted to those who would go onto farms and into experiment station work and for teachers. The first mentioned purpose attracts by far the largest number of students.

The greatest need of our agricultural work is the strengthening of the different departments so that they may keep abreast of corresponding departments in other states which are making rapid progress, and the establishment of new lines of practical instruction in agriculture which have become possible and indeed are necessary on account of the developments in recent years. Certain phases of farm management, plant and animal nutrition, plant and animal breeding, marketing and rural sociology, should be extensively developed in Iowa State College. In order to strengthen the present work and to provide for broadening it, larger sums should be available for salaries. The agricultural work has suffered seriously during the last biennium on account of the loss of professors who went to other institutions for much better salaries than this college could pay. The head of one agricultural department receiving our full salary for such a position was appointed to a corresponding position in another state agricultural college at 50 per cent increase in salary, making his salary almost the same as is received by the agricultural dean in Iowa. Another department head went to a corresponding position in a much smaller institution in another state with $1,000 added to his salary. Another professor accepted a position in an adjoining state at an increase of nearly 50 per cent in salary. Other such losses might be mentioned. The outstanding fact is that Iowa State College cannot secure and retain the best men in her faculty unless better salaries are paid. The agricultural departments are dealing directly with the largest interests of the state. Through the efforts of these departments, these large interests will be affected, at least to a small degree. The benefits resulting from the college instruction make the cost of this instruction seem trivial in comparison. In his report for the biennium, Acting Dean S. A. Beach emphasizes the need of strengthening the teaching staffs in the departments in the Division of Agriculture by increasing salaries. The following is taken from the Acting Dean's report:

> The reports of departments in the Division of Agriculture indicate distinct progress in perfecting the organization of the instructional staff and in the development of courses of study, together with a steady increase in student enrollment. It may be affirmed that the educational standards have been advanced.
>
> The increase in enrollment indicates what the report cannot well show, namely, that the training which has been received by the students in agriculture in this institution in the past has been of such a character as to command the respect and confidence of the people to such an extent that,

notwithstanding the raising of requirements, students are being attracted to this institution in annually increasing numbers.

The prospects are that during the ensuing biennium the laboratories and class rooms, more frequently than ever before, will be taxed to their capacity. Doubtless they will be insufficient to meet imperative needs, so that in some cases it will be necessary to provide more room to accommodate the growing demands of the work.

Careful study of the situation forces the conviction that more determined and persistent efforts ought to be made towards the development, in each department, of a more earnest spirit of research and of devotion to the permanent progress of the special lines of technical work represented. How can this be done unless certain specialists shall be given sufficient relief from administrative details or other forms of department service and from other distracting demands to give them liberty to devote persistent and concentrated effort to research? Such men should not be entirely divorced from the instructional staff.

The institution is fortunate in having connected with it experiment stations for carrying forward investigative work. It is not the purpose here to question the wisdom of the present policy of separating the experiment station workers from the instructional staff, so that they may uninterruptedly devote their time to their investigations. But this arrangement alone and of itself cannot fully meet the requirements in the field of instruction. Suitable provision needs to be made so that in each department at least one instructor will be at liberty to give a considerable portion of his time to research and at the same time keep sufficiently in touch with the instructional activities so that he can give inspiration and enthusiasm to his students and staff associates in the search for truth. Such enthusiasm, such inspiration, is vitalized and best maintained where opportunity is given to devote one's self to research work and to become identified with the progress of scientific achievement.

Agricultural Education Department.

The faculty of the Agricultural Education Department consists of Professor G. M. Wilson, two associate professors and one assistant professor. The work of this department is coming more and more into favor with the growing demands for teachers of agriculture in secondary schools and colleges. Among the students in this department are men who have had years of successful experience in public school work and are preparing themselves to teach agriculture. There were 424 enrollments in the classes in this department in the college year 1914-15 and 461 in 1915-16.

Agricultural Journalism.

The faculty of the Agricultural Journalism Department consists of Professor F. W. Beckman, one assistant professor and one instructor. This department does not offer work leading to a degree but gives instruction to students in agriculture, engineering and home economics so that they may be able to express their technical knowledge in language which will appeal to readers of newspapers and periodicals. The demand for technically trained young men and women to serve in the field of technical journalism is rapidly increasing and numbers of the graduates of the college have entered this kind of work. In the college year 1914-15 there were 266 enrollments in the different subjects offered in the department and in 1915-16 the enrollment was 315.

The department conducts a news service which is of special value to country newspapers giving them facts in regard to advancements in agricultural methods which have been worked out at experiment staions, and, through the newspapers, these facts come to the attention of the farmers for whose benefit they are intended. During the biennium more than 1600 different items of information and news were sent out. These items were carefully fitted to the needs of Iowa daily and weekly newspapers and farm journals, and the clipping service has indicated that all found more or less use.

Agricultural Engineering Department.

The faculty of this department consists of Acting Chairman M. F. P. Costelloe, one associate professor, one assistant professor, four instructors, one fellow and one scholar. This work is administered jointly by the Deans of Agriculture and Engineering. A four-year course leading to the degree of Bachelor of Science in Agricultural Engineering is offered, in which more than 100 students were enrolled in each year of the biennium. But by far the larger part of the energies of the department is given to teaching agricultural students who are required to take a number of subjects given in this department.

The work assigned to the Agricultural Engineering Department is for the most part in fields of comparatively recent development. Practically all the subjects given can be traced to fundamental activities in pioneer conditions. On many subjects the available literature is not very extensive. Not all of that which is available is in the very best form to be of much assistance in an educational way. For this reason, and also because of the wide variety of subjects included in the Agricultural Engineering classification, it has been found highly desirable to develop specialties within the department.

The different studies offered in the department are grouped under the following seven subjects: Farm Machinery, Farm Power, Rural Sanitation, Farm Structures, Rural Highways, Drainage and Irrigation. In arranging these subjects to meet the demands of the different students taking work in the department, thirty-three distinct studies are offered. During the college year 1914-15 there were 1,715 enrollments in the different classes and 1,712 in 1915-16.

On many of our farms today, the valuation of buildings per acre exceeds the valuation of both land and buildings twenty years ago. Few farms in the state are completely equipped with the buildings which are needed to properly operate the farm. In addition to this, replacements are continually required. There are 224,771 farms in the state, and the amounts expended upon complete groups of farm buildings on farms of average size range from $4,000 to $12,000 and even higher. There are few successful farms in Iowa where the cost of farm buildings per acre does not exceed $50.00. On such farms the interest and depreciation charges will frequently show that the farm must pay $2.00 a day for the use of buildings alone. Proper designing, arrangement and selection of materials will reduce the upkeep cost. The student of agriculture realizes that one of the big problems which he must face in farm operation is that of properly investing the money which he must spend on the erection and maintenance of the structures required to follow the types of farming which are best for his own interest and for the state as a whole.

In response to the demand for machinery to meet the requirements of modern methods of tillage, manufacturers have placed upon the market a large variety of machines. There is a noticeable increase in the extent to which power is used on farms. A very large percentage of the grain harvesters in the state are now equipped with gas engine motors for operating the machines, and horses are used only for drawing the machines across the fields. The corn picker-husker which handles the corn crop with practically no manual operation is also operated by a power unit. In some cases tractors have been successfully used to propel them.

There is a demand for brief courses on rural sanitation, modern lighting systems, sanitary water supplies, and sewage disposal. The farmer is interested in the installation and operation of the necessary equipment to give the farm home at least some of the advantages now so generally enjoyed by those living in cities. The department is attempting to meet this demand by class and laboratory instruction which is given in a brief, practical way.

Animal Husbandry Department.

The work of the department is divided along the lines of special interest,—animal husbandry, dairy husbandry, and poultry husbandry. A farm department is operated in connection with the Animal Husbandry Department, in which the live stock used in the classroom demonstration work is cared for. A farm of two hundred acres is maintained, and is divided into land for crops and pastures. The poultry used in classroom work is maintained on a separate farm of twenty acres devoted entirely to this work. The dairy husbandry stock is taken care of on a separate farm of two hundred acres.

The faculty in charge of the animal husbandry work proper consists of Professor W. H. Pew, head; five associate professors; one instructor, and four scholars. The work in dairy husbandry is cared for by one professor and one assistant professor, and the work in poultry husbandry by one professor and two instructors. The enrollments in the different classes during the college year 1914-15 were 2,817, and in 1915-16 2,904.

The changes in courses in the various lines of animal husbandry work have been few and are of minor importance. It has been planned, however, to strengthen the work by the addition of studies in meats. Opportunity to carry on this work will be afforded when the new animal husbandry laboratory is completed. The work in dairy husbandry will be strengthened by the addition of the dairy barn which will be completed early in the next biennium. Facilities for the poultry husbandry work will be increased by the addition of a poultry house for young laying stock.

The student judging teams have taken part in different live stock judging contests and have made very good showings. In 1914 the usual judging contests held in connection with the American Royal Live Stock Show in Kansas City and the International Live Stock Exposition at Chicago were not held on account of the prevalence of foot and mouth disease. The dairy judging team, however, had opportunity to compete in a contest held in connection with the National Dairy Show in Chicago. Sixteen teams competed; and a team from this college ranked second in the judging of Jerseys, and fourth in the entire contest. In 1915, at the American Royal Live Stock Show, the judging team ranked third. At the National Western Live Stock Show at Denver, Colorado, in January, 1916, the judging team from this college ranked first. The young men on the team made a remarkable record in this contest. They did the most efficient work in the judging of horses and beef cattle.

In June, 1915, the graduating class in Animal Husbandry was the largest that had ever completed the course. Sixty-nine men received their degrees. In June, 1916, sixty-two men received their degrees in Animal Husbandry. A large percentage of these men have gone back to the farm, either as owners, part owners or renters, or in charge of herds of live stock. Some have gone into county agent work and some into college and experiment station work.

The graduate work in the department has developed as rapidly as could be expected and some excellent work has been done by the men pursuing the graduate studies. In 1915, four men received their Master's degrees in animal husbandry. In 1916, eight received the same degree. There has been a strong demand for instructors and experiment station workers in animal husbandry this year. In fact, the demand exceeds the number of available men capable of carrying on such work. Seven men have gone into college and experiment station work from the 1916 graduating class.

A new farm for this department is greatly needed.

Agronomy Department.

The Agronomy Department includes the work in soils and farm crops. The factulty consists of Professor W. H. Stevenson, head of the department and professor of Soils; Professor Hughes, head of the Farm Crops work; one professor, two associate professors, one instructor, one half time instructor, two fellows and one student assistant in Soils; and one associate professor, one assistant professor, three instructors, one fellow and one student assistant in Farm Crops. The enrollment of students in the different studies in soils has continued to increase. In the college year 1914-15 there were 590 enrollments and in 1915-16, 780 enrollments. This indicates a large increase of enrollment from the first to the second year of the biennium. The enrollment of graduate students in the department has increased from 13 to 17 in the biennium.

Additional room in the Agricultural Building was recently assigned to the Soils Department. This space has relieved the pressure on the department for the present and immediate future. However, every indication points to the fact that within one or two years the soils laboratories will be as crowded as they were up to the time the new laboratories were occupied.

During the biennium some important changes were made in the undergraduate courses in soils. For instance, soil bacteriology, heretofore offered in the senior year is now given in the junior year. This change will enable many students to take advanced soil bacteriology in the senior year. There is a growing demand for this work. Provision has also been made for one or more studies in geology, this work being of great value to students taking major work in soils. A grouping of the studies in soils has been perfected in order to strengthen and unify the work of the student. The groups are as follows: Soil Physics; Soil Bacteriology; Soil Fertility; Soil Management; Soil Surveying; and Thesis and Seminar.

The class room and laboratory methods that have been used by the instructors in soils during the past two years are based upon many trials and long experience. These methods, without exception, are giving satisfaction, but an earnest effort is made at all times to work out such changes as new conditions may suggest or make necessary.

The college has been most fortunate in maintaining its staff of instructors in the farm crops work with comparatively few changes. This has had much to do with the increased effectiveness with which the work in farm crops is now being taught. All of the studies are becoming more definitely organized each year and the work has been so arranged that the various instructors can make much more thorough preparation than has been possible in the past. Through the transfer of a portion of the farm crops experiment station work to the temporary building on the agronomy farm, it has been possible to make additional rooms available for instructional work and so relieve crowded conditions. This has resulted in greatly increasing the value and efficiency of the work. The enrollment in the different classes in farm crops continues large. In the college year, 1914-15, there were 1,121 enrollments and in 1915-16, 1,138 enrollments. The members of the staff work long hours in order to take care of their classes. For instance, one professor in the fall term taught three sections of Farm Crops 3, each section meeting twice a week. He also had charge of one laboratory section in Farm Crops 1, as well as assisting in a second division. During the second semester he had a section in Farm Crops 2 which met twice a week. He gave ten lectures and four hours laboratory work per week in Farm Crops 33 "Forage Crop Production." He directed the work in the farm crops seminars 19 and 20 during both semesters. This work requires considerable time in conference with students and in revising and correcting manuscripts. He also had charge of the practical farm work looking after the placing of students on farms for the summer months.

Dairy Department.

The faculty of the Dairy Department consists of Professor Mortensen, head of the department; one associate professor, one assistant professor, four instructors and two fellows. During the college year, 1914-15, there were 560 enrollments in the different classes and 605 in the year 1915-16.

This department has for years been recognized by the dairy schools of the United States for its strong and efficient work, particularly along the lines of butter-making and creamery management. Work in market milk was started two years ago. This has become popular among the students. The investigations and the scientific as well as practical instruction carried on along the lines of market milk have, so far, received recognition from a large number of the Iowa producers as well as from many consumers.

During the past two years, much attention has been given to the subject of cheese making. In 1914 Iowa cheese factories manufactured 704,463 pounds of cheese which is only about ten per cent of the amount consumed in the state. It has been the opinion of the department that Iowa can well afford to manufacture enough to take care of its needs. For that reason, special emphasis has been placed on the cheese industry by the members of the dairy faculty.

The Dairy Department has also realized the importance of the ice cream industry, which during recent years has become an important branch of dairy manufactures. An ice cream laboratory has been equipped and ice cream making was taught at this college before any other school in this or in any foreign country took up such work.

Additional room is greatly needed for the ice cream and market milk work. The present market milk laboratory is too small for economic and convenient arrangement of machinery. It is necessary to have some of the machinery in another room which will not allow of efficiently handling the instruction work. The ice cream laboratory is, at present, in a small basement room which is inadequate for the work required. From the standpoint of sanitation, it is objectionable to have such a laboratory in a basement room. Some states, in fact, object to an ice cream factory being so located.

A laundry could be operated profitably in connection with the Dairy Department. Such a laundry would be of instructional value to the students in dairying in view of the fact that farmers have begun to operate co-operative laundries in connection with co-operative creameries.

Farm Management.

The faculty of the Farm Management Department consists of one professor and one fellow. The department gives instruction to students registered in agricultural courses, the special purpose of its instruction being to co-ordinate the technical work given in different departments and to show how business methods may be introduced into farm operations.

Horticulture and Forestry.

Professor S. A. Beach is head of the department and Professor of Horticulture. Professor G. B. MacDonald is in charge of the work in Forestry. One associate professor, two assistant professors, two instructors, one fellow, two scholars and one student assistant are on the horticultural staff and one associate professor, one assistant professor and one student assistant are on the forestry staff.

The major lines of work in horticulture have been separated into the following groups: Landscape Gardening, Floriculture, including Greenhouse Management; Truck Crops and Market Gardening; and Pomology, including Plant Breeding. The development of the work in Plant Breeding into a major line of Plant Genetics or of General Genetics seems now to be demanded by the growth of the college. During the biennium the equipment of the department was enlarged by the construction and equipping of a plant laboratory building with attached modern greenhouses having about 30,000 square feet under glass. This equipment makes possible more efficient work in various lines of plant industry, particularly in soil cultures, plant genetics, floriculture and the forcing of vegetables.

Provision is being made for adequate instruction in the lines of forestry work which are of leading importance in Iowa. General forestry has its application on practically every farm in the state, as well as on the two and one-half million acres of natural forest land and waste area in this state which are unsuited for agricultural crops. Instruction in farm forestry includes the subjects of wind breaks, shelter belts and wood lots for the farm; also the utilization of native timber for fence posts and for other farm purposes. The special courses give more technical training. Graduates of the four year and five year courses are able to go into government or state positions or into private work with municipalities, railways, lumber companies, and large estates.

A notable feature in the development of the forestry work during the past biennium has been the twelve weeks' summer camp in some forest region where instruction is given by the forestry staff in field operations, consisting of estimating timber, mapping forest types, making volume tables and studying logging and milling operations. The 1914 camp was held in the Minnesota National Forest; the 1916 camp in the forests in Washington and Oregon.

The enrollment in the different studies offered in the Department of Horticulture and Forestry was 3075 for the biennium, or an average of 1,537 for each year. This was an increase of twenty-three per cent over the college year 1913-14.

Photography.

A limited amount of work in Photography is given to students who desire enough training to enable them to take ordinary pictures of special features in connection with their technical work. For instance, agricultural students wishing to go on with advanced work, need to know how to take pictures of the special subjects they are investigating. Engineering students, at times, need to take pictures of structures upon which they are working after they have gone into professional work.

ENGINEERING.

With the increase of engineering activities and interests in the state, it is important that engineering education in the Iowa State

College should be kept up to standard and ample for the needs of the State. Notable progress has been made during the biennium.

The following is taken from the report of Dean Anson Marston:

The attendance of collegiate engineering students at the Iowa State College has shown a steady and fair rate of growth during the biennial period, reaching 738 for the year 1914-15 and 746 for the year 1915-16. In each of these years the attendance of collegiate engineering students was the largest we have ever had. This period of growth follows a period during which engineering attendance decreased all over the United States. The demand for our graduates is now much larger than we can supply, and it seems reasonable to forecast a fair rate of growth for the immediate future.

During the biennium the transportation engineering plant has been completed, and, as a consequence, our instruction in railway engineering has been materially improved. In addition, we have introduced instruction in automobile engineering and the courses have proved quite popular with the students. We plan to improve this work in the near future and to introduce advanced courses for the senior engineering students.

Important work has been done with the locomotive testing plant on an investigation of the values of Iowa coals as compared with Illinois coal under actual locomotive conditions. The results are now being calculated.

On earnest recommendation of the telephone interests of the State of Iowa, we have introduced special work in telephone engineering with a specialist in charge. This work began in the fall of 1915. We have equipped a telephone and telegraph laboratory, and plan considerable future extension of this work.

The department of Structure Design was opened at the beginning of the biennial period and it is doing excellent work, especially in teaching our technical students something about the proper application of elementary artistic principles of design to the design of industrial structures, agricultural structures and home structures. In addition, the department is successfully training an unexpectedly large number of men in a standard four-year course for work with the building contractors and to practice in the actual making of designs for agricultural, industrial and home structures. The work given is essentially engineering, and the students taking it receive a more thorough training in structural engineering than those in any other course in the college. In addition, proper attention is given to the principles of structure design in general.

We have also been giving special attention during the past year to the development of instruction in business engineering. In the last catalog a considerable group of studies has been outlined and called to the attention of our technical students, who now find it possible to take systematic work in this important line which is receiving more and more attention in the engineering colleges of the country.

The last legislature passed a law calling upon the state educational institutions to do special work for the State in the survey of Iowa's meandered lakes. I am pleased to report that when this matter was called to the attention of our engineering faculty and students they responded cordially. Several of the professors have assisted in connection with this work at some personal sacrifice. Quite a large number of students have also engaged in this work. Neither faculty members nor students received any pay. Their bare expenses were paid by the State. In this manner, some nine of the lakes of the State have been surveyed by Iowa State College professors and students.

On June 22-25, 1915, the annual convention of the Society for the Promotion of Engineering Education was held at the Iowa State College. The selection of this institution for that purpose may be considered as a high compliment to the standing of the college as an engineering school, and as a recognition of the good quality of engineering instruction now being given in the Middle West. It was necessary for the faculty of the college to make special arrangement for the entertainment of the delegates at the convention. The members of the society have been kind enough to express high appreciation of the courtesy shown them.

Agricultural Engineering.

This department is administered jointly by the Divisions of Agriculture and Engineering and is referred to in connection with the Division of Agriculture.

Chemical Engineering.

This work is administered jointly by the Divisions of Engineering and Industrial Science and is associated quite closely with the departments of Mining Engineering and Chemistry. The position of Associate Professor in Chemical Engineering became vacant in 1915 and was not filled until the spring of 1916, when Doctor C. A. Mann, of the University of Wisconsin, was appointed. Mr. John S. Coye, Chief Chemist of the Engineering experiment station, served as acting associate professor of chemical engineering during the year 1915-16 and rendered very useful service. The number of students taking the chemical engineering course is increasing materially, and it is believed that the department has a good future ahead of it. There is an awakening of interest on the part of manufacturers to the possibilities in the manufacture of chemicals, dyestuffs, etc., due to the continued duration of the war; and this has created a large demand for specialists trained in chemical engineering. In the college year 1914-15 there were 16 enrollments in the department and in 1915-16 there were 87.

Civil Engineering.

The work of the Civil Engineering Department continues as in former years. The faculty consists of eleven men, so that a specialist is in charge of each important line of work. The advanced work in structural engineering, railway engineering, and highway engineering has been especially developed in recent years. The demand for civil engineering graduates is especially heavy at the present time, and we are unable to recommend enough men to fill the positions open. In the college year

1914-15 there were 1,522 enrollments in the different subjects offered in the department and in 1915-16, 1,632.

Electrical Engineering.

This department is in charge of Professor F. A. Fish, assisted by two associate professors and two assistant professors. During the past biennium, an associate professor of telephone engineering was added to the staff. The class rooms and laboratories of the department have been concentrated in one building during the biennium, and this has promoted efficiency in the work. A new sub-station has been provided for the power plant and a new laboratory for work in telephony and telegraphy. During the college year 1914-15 there were 524 enrollments in the different subjects offered in the department and in 1915-16, there were 672.

Mechanical Engineering.

The department is in charge of Professor W. H. Meeker, assisted by three associate professors, five assistant professors, seven instructors and part time of an associate professor who gives half of his time to the Engineering Extension Department. This department gives instruction in mechanical drawing, descriptive geometry and mechanics, as well as in the regular mechanical engineering work. The staff has been increased during the past year by the addition of an associate professor of automobile engineering on part time, and a drawing room instructor. The new steam and gas laboratory has been put in full use during the biennium. Some special work in shop economics and in power engineering has been developed. There has been an increased demand for instruction in manual training which has led to the introduction of advanced work in this line. This work has been elected by both men and women students. The work of the department has grown so much that a new foundry building is needed. This would leave the old foundry building available for use to house work in manual training which has been developed extensively during the biennium and space for which is now overcrowded.

The number of enrollments in the different subjects offered in the department during the college year 1914-15 was 2,448 and in 1915-16 the number was 2,826.

Mining Engineering and Geology (Including Ceramics).

Professor S. W. Beyer is in charge of this department and is assisted by two associate professors and one assistant professor. Professor Beyer also acts as Vice-Dean of the Engineering Division.

The Department of Mining Engineering and Geology has been developing technical work in geology, especially for the agricultural students. There seems to be an important field for future work in this direction, which we should cultivate fully. An assistant professor of geology has been added on this account.

Associate Professor H. F. Staley has immediate charge of the ceramics work. The work of this course is progressing and has been recognized by the clay interests of the state, through the election of Professor Staley to the office of Secretary of the Iowa Clay Products Manufacturing Association. The number of students in ceramics continues to be low, though increasing; and it should be larger, for there is quite a demand for graduates to fill remunerative and responsible positions.

The number of enrollments in the different subjects offered in the department during the college year 1914-15 was 183 and in 1915-16 it was 206.

Physics.

The work in Physics is in charge of Professor L. B. Spinney, assisted by two associate professors, two assistant professors, six instructors, one half-time instructor and one fellow. The work in physics has been growing so rapidly during the biennium, especially as regards the teaching of physics to agricultural and home economics students, which comprises a large part of the work of the department, that it has been found necessary to equip two new laboratories in the third story of the engineering annex. This was formerly attic space used for storage. The department is greatly in need of a separate building at an early date. It has also been found necessary to increase the teaching staff and to provide additional class and office rooms.

The number of student enrollments in the different subjects offered in the department was 1,082 in the college year 1914-15 and 944 in 1915-16.

Structure Design.

The work in Structure Design is in charge of Professor A. H. Kimball assisted by one instructor. The development of this work has been mentioned above. The department has been provided with rooms in the fourth story of engineering hall which have proved fairly satisfactory, although the department is already in need of additional space. The number of student enrollments in the different subjects offered in the department was 159 in 1914-15 and 288 in 1915-16.

Transportation Engineering.

The administration of the transportation engineering plant has been organized in such a manner as not to cripple existing departments by dividing their work, while, at the same time, securing efficient administration of the plant as a whole. Professor E. E. King, of the civil engineering department, has been made superintendent of the plant. The instruction work in locomotive engineering and in automobile engineering, as well as much of that in highway engineering is given in this building.

HOME ECONOMICS.

During the biennium, this division has retained the large enrollment which developed during the preceding biennium and it has continued to increase in number of students. Most of the young women enrolled in the Home Economics Division are looking forward to teaching positions. We are coming to realize that justice has not been done in the way of furnishing educational facilities adapted to the needs of women, and gradually the error or unfairness of the past is being corrected. No longer is it necessary to argue that women, as well as men, are entitled to higher education to fit their special requirements.

Home Economics instruction has been given at this college since its establishment, and this institution has come to be looked upon as one of the leaders in this field of education. The college has been honored by the election, in June, 1916, of Dean Catharine J. MacKay as President of the American Home Economics Association, the leading organization of home economics workers.

Home Economics work is quartered now in six different buildings, one of which is located off the campus in a residence part of the city. The present home economics building was planned for about 250 students. With an enrollment nearly three times as large, the need of outside space is obvious. The separation of class rooms and laboratories makes for loss of time in passing between them and for loss of efficiency in administration. Besides, it is a fact that some of the space loaned to the Home Economics Division is needed by other departments. All these points are arguments for a new building suited to home economics instruction as given at this college. Such a building would cost $275,000. It should include facilities for all work given in domestic science, domestic art, household decoration and certain other activities of the department and of women's work.

Some experimental work in Home Economics has been undertaken and it is proposed to investigate additional problems as conditions and facilities permit.

During the biennium, ten teachers resigned from the home economics staff. This is too heavy a loss. It is expected that some teachers will resign, but when so large a number or so large a proportion of the total staff withdraws, the efficiency of the work is injured. The following is taken from the report of Dean Catharine J. MacKay:

> In the year ending June 30, 1915, 521 students were enrolled in the regular collegiate home economics course. In the following year the enrollment was 546. This indicates an increase of 100 or about 20 per cent over the enrollment of the preceding biennium. In addition there were students in other courses who elected some work in the Home Economics Division.

The home economics classes generally are large, as is shown by the following statement of enrollment in the different classes:

ENROLLMENT.

Domestic Science	Fall 1914	Spring 1915	Fall 1915	Spring 1916
Personal Hygiene (H. Ec. 41)	194	...	218	...
Foods—Selection & Preparation (H. Ec. 43)	141	...	146	16
Foods—Selection & Preparation (H. Ec. 44)	...	130	...	133
Nutrition & Dietetics (H. Ec. 45)	75	...	70	...
Nutrition & Dietetics (H. Ec. 46)	...	72	...	65
Home Nursing (H. Ec. 47)	...	72	...	79
Foods—Advanced Cookery (H. Ec. 48)	79	...	99	...
Foods—Advanced Cookery (H. Ec. 49)	...	78	...	94
House Sanitation (H. Ec. 37)	17	Discontinued		
Practice Teaching in H. Ec. (H. Ec. 9)	71	73	72	70
Graduate Dietetics	1	...	...	...
Domestic Art:				
Textiles & Clothing (H. Ec. 1)	204	...	193	13
Textiles & Clothing (H. Ec. 4)	...	184	...	176
Advanced Textiles & Clothing (H. Ec. 6)	85	...	109	...
Advanced Textiles & Clothing (H. Ec. 7)	...	148	...	104
History of Art-Painting (H. Ec. 11)	64	Discontinued		
History of Art-Painting (H. Ec. 12)	...	61	...	68
History of Art-Sculpture (H. Ec. 14)	...	...	66	...
Handicraft (H. Ec. 15)	...	...	7	...
History of Costume (H. Ec. 16)	...	...	11	...
Applied Dress Design (H. Ec. 33)	13	...	...	9
Millinery (H. Ec. 35)	11	..	34	...
Advanced Millinery (H. Ec. 36)	1	25	...	20
Drawing (H. Ec. 50)	141	...	156	...
Applied Design (H. Ec. 51)	...	128	...	151
Costume Design (H. Ec. 52)	...	4	16	...
Textile Design (H. Ec. 54)	...	13	...	15
The House (H. Ec. 60)	68	...	109	...
The House (H. Ec. 61)	...	82	...	101
Household Management (H. Ec. 63)	...	...	72	...
Household Accounts (H. Ec. 62)	65	...	...	...
Total	1,230	1,070	1,378	1,114

During the biennium, the changes in the required course of study for the collegiate work have been few. The credit hours required per semester have been reduced. The maximum does not exceed 18 hours and the minimum requirement is 16 2-3 hours. Arrangements have been made for students who have received considerable instruction in home economics subjects (such as sewing and cooking) in the high school, so that they are not required to repeat the work.

If, however, the students are not able to meet the requirements they are demoted to the beginning work. If the advanced work can be carried successfully, more time for elective studies is allowed. Other studies added are camp cookery for men, experimental problems in foods, household management, handicraft, sketching and advanced studies in foods. Work in textiles and design has been added, at the urgent request of students seeking electives in these subjects. An expert instructor in household accounting has been added to the staff, to give instruction in household accounts and co-operate closely with the division in the study of household budgets.

Progress has been made during the biennium in the equipping of laboratories. The laundry has been rearranged and new equipment added, and an ironing room has been equipped. This adds greatly to the facilities for instruction in the household management classes.

Owing to the development of the college work offered in the division, it has been necessary to open two domestic art and design laboratories in the chemistry building. Two new applied art laboratories have been opened in the emergency building, a frame structure originally erected to accommodate chemistry work after the chemistry building was destroyed by fire. The demonstration laboratory is located in a back room of Margaret Hall. There are serious objections to placing any of the home economics classes outside of the building. It interferes with the unity of the work, and it is more difficult for instructors to co-operate with one another; also, the students do not secure the close association of all the work given.

At the end of each school year an exhibit of the students' work in every department is given. In May, 1916, a representative exhibit of the students' work in applied art was sent to the Western Drawing and Manual Training Association meeting at Grand Rapids, Michigan. A great deal of favorable comment on this exhibit has been received.

The practice teaching in home economics is carried on in co-operation with the Agricultural Education department and the Superintendent of Schools in the city of Ames. Two cooking and two sewing laboratories are provided in the Central school building and one in the Welch school building.

Many of the graduates of the Home Economics Division are called upon to give demonstrations before women's clubs, county fairs, extension classes in school work and other groups; and to meet this need, all home economics students are given practice in demonstration work. This work is given in the demonstration laboratory in Margaret Hall, the equipment of which has been kept very simple and plain, and corresponds closely to such equipment as could be found in any outside community.

It is planned to have a practice house next year to enable the division to give practice work in the management of a household. The senior students will be required to spend a short time in the house and to take the responsibility of management for the family group. They will be required to perform each one of the duties of the house at some time during the period. Perhaps the chief objection to our graduates' undertaking instruction in home economics is that they are not familiar with the actual division of time and labor required to perform household tasks, and that, because of lack of experience, they are not able to evaluate the essentials and non-essentials of the household problem. True, all the problems of the family cannot be included in a "practice house," but many details of household management may be practiced and some part of the problem realized.

There is a demand for a course of study which will include agriculture and home economics. Many young women return to farm life and many manage farms in the State of Iowa. This year, one of our graduates has been selected as the first county adviser in home economics in the State of Iowa. No doubt the demand for trained women for such work will steadily increase.

Many of the young women in the home economics division desire to follow some employment other than teaching in which trained service is required. Several graduates have taken positions as dietitians in hospitals and as managers of institutional work such as dormitories and dining rooms, etc. The college dormitories afford a splendid opportunity to give such instruction, if one of them could be turned over for laboratory work. This should, of course, be under the supervision of the division and an instructor who is fully capable of giving the best instruction. The plan should involve very little expense to the college except for equipment of the dining room, and should be a self-supporting proposition. The demand for trained institutional managers is constantly increasing and a course of study should be worked out to train the students in this work. Each year we have students who are residents of the state drop out of our classes and go to Chicago University, Teachers College Columbia University, and other schools giving instruction in institutional management.

Some problems relating to home economics have been studied. The field offers many opportunities for research, and difficult problems are awaiting solution. This is especially true of problems relating to the farm home. A research worker should be employed and a laboratory fully equipped to undertake this important work. Other departments of the college interested in such research work are willing and anxious to co-operate with us.

The Physical Culture Department was placed under the Home Economics Division for the purpose of administration during the year 1914. Physical training work is required of all freshmen and sophomore women students in the college. Each student is examined by the physical director and her assistants, and a record is made of the physical condition upon entrance to the classes and then again at the close of the college year. Comparison is then made and the student showing the greatest progress in physical development is rewarded by an "Honor" and an "A" presented by the Athletic Association.

Many of the women graduates of the college are required to teach gymnasium work in the high schools and colleges where they accept positions in connection with their other teaching work. For this reason the demand has arisen for a Normal Class in teaching physical culture. To meet this demand, the department has added one study in practice teaching, and a certificate will be granted upon the successful completion of the work prescribed.

Corrective gymnasium work is provided for students who are not physically able to take the regular class work in the gymnasium. A marked improvement in the physical condition of these students has been noted and by the end of one semester many are able to enter the regular classes.

The Women's Gymnasium is located in Margaret Hall, a women's dormitory. In the basement of the building are located lockers and showers, and provision has been made for the construction of a swimming pool in another part of the basement. The space available is not sufficient, however, and a modern up-to-date gymnasium for the young women of the college is needed. Such a building would include exercise floors, locker and shower rooms, swimming pool, consultation and examination rooms and a room for the accommodation of those interested in athletics. The present exercise room does not provide sufficient space for basket ball contests and other physical tests to which the public is admitted. The new gymnasium should also provide space for running track.

The outdoor exercise taken by the young women includes, hockey, tennis, golf and baseball. At the close of the college year, usually in the month of May, it has been customary for the young women in the department to give a May Day Pageant. The pageants have been given on the college campus when the weather has been favorable, and have been unusually successful, interesting and profitable.

INDUSTRIAL SCIENCE.

In my last report, the function of the Industrial Science Division in this college was discussed in some detail. By far the largest part of the work of the division is in the teaching of fundamental sciences to students in the Divisions of Agriculture, Engineering, Home Economics, and Veterinary Medicine. A very small portion of the energies of the division is expended in the teaching of students enrolled in the four-year course in industrial science,—in fact less than five per cent. In the fundamental work given by the departments in this division for the benefit of students in the other technical divisions, special emphasis is placed on the practical applications, and only so much of this kind of work is given as is necessary for the all around training of such students. The charge which is sometimes made, that the college is trying to establish a liberal arts course, is not founded on any basis of fact. The work given in the Industrial Science Division is essential or important to the work in agriculture, engineering, home economics, and veterinary medicine, and courses in these subjects could not be well carried on without it.

The following is taken from the report of Dean R. E. Buchanan:

Material progress has been made during the past biennium by the Division of Industrial Science in the task of fulfilling, in Iowa State College, the threefold function which has been allotted to it. The functions of the division are:

First: To serve as an administrative unit which has charge of instruction in those sciences which are basic to technical and industrial education. The departments which serve this purpose are: Bacteriology and Hygiene, Botany, Chemistry, Applied Economics and Social Science, Mathematics, and Zoology and Entomology.

Second: To serve as an administrative unit for those departments which have charge of instruction in subjects not sciences which are requisite to the proper education of technical students. These so-called service departments are English, History and Psychology, Library, Military Science and Tactics, Modern Language, Music, Physical Training, and Public Speaking.

Third: To encourage the development of education in those industries not wholly included under the headings Agriculture, Engineering, Home Economics, or Veterinary Medicine, which need the technical application of the sciences taught in this institution (such as economic entomology and diseases of plants).

In conformity with the purpose first noted, the science departments of the division have been materially strengthened during the past biennium. A thorough revision of the studies offered by these departments has been made, with the object of eliminating any subjects which could be justly urged as unsuited or unnecessary for the adequate training of technical students and to add such new subjects as have been necessitated by the recent rapid advances in the applications of theory to practice in technology and the industries. While it is true that pure science cannot be sharply differentiated from applied science, the effort is being made consistently to lay particular emphasis upon those phases of science which have their applications in the industries and in technical fields. In addition, these departments in most cases include the teaching of certain advanced studies which are in themselves the technical application of elementary or pure science. For example, advanced courses in chemistry are given in the manufacture of certain important chemical products; advanced courses in bacteriology have for their purpose the testing of the efficiency of engineering structures such as sewage disposal plants and studying the fermentation processes used in the manufacture of bread; and advanced courses in mycology in the Department of Botany have to do primarily with the diseases of crops and their cure and prevention. In short, our science departments are endeavoring to do what is within their power to advance the interests of technical and industrial education in so far as this constitutes the province of an agricultural and technical institution.

The service departments of the division of Industrial Science have, likewise, been studied carefully during the past biennium, and much reorganization has been effected. Departments such as these, which have to do primarily with the more strictly cultural work, seem to offer a particularly difficult problem in a technical institution. No one could contend successfully that subjects such as history, English and the languages should not be taught to the extent that is necessary for the training of technical students. In many departments, the subject matter taught has been revised and some studies have been dropped either because they might be regarded as not necessary to the work of the institution or in order to replace them by studies which would be of greater value. Frequent conferences between the teaching staffs of these departments and the men and women of the technical departments have been of material assistance in the reorganization of the work. The complaint has been voiced by some that undue restriction upon the development of advanced work in the departments such as English, languages, and history, would interfere seriously with securing teachers of recognized ability. It has been urged that we cannot hope to retain good men when they are held to the teaching largely of elementary courses. Our experience of the past two years has shown that such is not necessarily the case. Our teachers have come to realize that they are confronted with problems just as interesting and attractive as those offered by the stereotyped line of advanced subjects often taught in such departments. For example, our Department of History has been developing the field of agricultural, industrial and economic history, feeling that such subjects are of great value to our students. In consequence, the work in political history has been reduced to the minimum. In the Department of English, the customary advanced courses in old English, period literature, etc., have been dropped, and the creative and research work of the staff has been along the lines of working up elementary courses for particular groups of students. The teachers in charge of the work in English for our students in Home Economics have published a book on English composition, written with the needs of these particular students in mind. Two groups of essays relating to farm life and rural problems have also been edited by the staff which teaches students in agriculture. These books have proved very helpful in interesting such students in English and have been successfully used in other universities which have to deal with similar problems. The teachers who give instruction primarily to engineering students have been making a careful survey of various books and articles on engineering in order to discover those which show good English style. It is expected that the publication of their results will be of considerable importance to teachers of English in institutes of technology.

In pursuance of the third function of the Division of Industrial Science, considerable attention has been paid to the training of students in certain specialized and technical applications of the sciences. It has occasionally been urged that our course in Industrial Science does not differ in its opportunities from courses sometimes termed "liberal arts". We believe that this is wholly untrue. The records will show that during the past biennium, many requests have been received from prospective students who desire to specialize in languages, English, literature, or in other of the so-called liberal arts subjects; but these have been uniformly refused. It cannot be too often emphasized that this course is to train men and women for efficient service in certain limited fields of professional and industrial sciences, especially those requiring as support, strong technical courses such as are offered in Iowa State College. Among the graduates from the course in Industrial Science this year was one who majored in Geology, the better to fit himself for work in soil survey with the Department of Agriculture. Another majored in chemistry and bacteriology to fit himself for work on the problems related to the baking industry. Another who majored in veterinary anatomy expects to complete the course in veterinary medicine. Several of the women who completed the combined course in home economics and industrial science, majored in chemistry that they might be better equipped for work in the fields of nutrition and dietetics. One of the men who majored in bacteriology expects eventually to engage in experiment station work.

Bacteriology and Hygiene.

The faculty of this department consists of Professor R. E. Buchanan, head (also dean of the division), one assistant professor, one instructor, and two fellows. The work in soil bacteriology in the Agronomy Department, the work in dairy bacteriology in the Department of Dairying, and the work in veterinary bacteriology in the Division of Veterinary Medicine are carried on in co-operation with this department.

The major portion of the work of the Department of Bacteriology and Hygiene has been housed for about ten years in Central Hall. During the past biennium the laboratories have become overcrowded. Accordingly, a building was planned and is now in process of erection. This building will give adequate room for the department for several years to come.

During the biennium, the work of the department has been materially strengthened by the increased attention given to studies in sanitary bacteriology intended primarily for students in sanitary engineering. Additional attention has also been paid to the development of elementary and advanced bacteriology for students interested, primarily, in household and fermentation problems. The department has been called upon, also, to give an increasing amount of graduate instruction. The relationship of bacteriology and hygiene to technology and to the industries is becoming more and more evident.

Research and investigational work has been carried on in several different lines. A study is being made on the micro-organisms responsible for the fermentation of silage and for its preservation, also of the organisms which cause deterioration of silage. Similar work has been done during the biennium on sauerkraut. Studies have been made, also, of the organisms which aid in the detection of water pollution, and work has been done on the efficiency of sewage disposal plants, with particularly gratifying results. Likewise a study has been made of the organisms in the soil which might lead to erroneous conclusions concerning the potability of water. A classification of bacteria, particularly those forms of economic importance, has received considerable study from members of the departmental staff.

During the college year 1914-15, there were 300 enrollments in the different studies offered in the department, and in 1915-16 there were 346.

Botany.

The faculty of this department consists of Professor L. H. Pammel, head, two associate professors, one assistant professor, three instructors, one one-half-time instructor, two fellows, and four student assistants. During the winter of 1915-16, Harriette S. Kellogg, Botanical Curator, died. She was an exceptionally faithful and efficient worker and left a position which it will be very difficult to fill satisfactorily. In January, 1916, Dr. I. E. Melhus was added to the staff as associate professor of plant pathology. It is expected that much emphasis will be laid upon the problems relating to plant diseases.

The Department of Botany has been housed during the past biennium in two separate buildings. All of the work, except that in plant physiology, has been given in Central Hall. Plant physiology has been taught in Emergency Building, which was erected three years ago for the use of the Department of Chemistry. The laboratories and offices have been greatly overcrowded, particularly during the past year. The removal of the Department of Bacteriology and Hygiene from Central Hall will permit a much needed expansion on the part of the Department of Botany in Central Hall, and the removal of the Department of Zoology from Morrill Hall will give a much more adequate housing of the work in plant physiology. However, it should be emphasized that the department is working under a handicap in being housed in two separate buildings. The eventual housing of the Department of Botany in a Plant Industry Building, or in an addition to the new Science Building, should be kept in mind. The construction of the new plant propagation laboratories and greenhouses has made it possible for the Department of Botany to occupy some much-needed space in the old greenhouses. This room will be especially useful for the teaching and investigational work in plant physiology and plant pathology.

The number of enrollments in the various studies offered in the department was 1,212 in the year 1914-15, and 1,367 in 1915-16.

Chemistry.

The faculty of this department consists of Professor W. F. Coover, chairman, four associate professors, three assistant professors, five instructors, thirteen assistants, two fellows, and several student assistants paid at the rate of twenty-five cents an hour. Professor A. A. Bennett, former head of the department, is on leave of absence without pay. There have been a great many changes in the staff of the department during the biennium, because of low salaries paid. In a number of cases, the salaries are so low as not to provide a living wage. It is urgently recommended that provision be made for more adequate salaries, especially for assistants and instructors. An earnest effort is being made to build up and maintain a well-trained staff by encouraging and making possible the pursuit of research work. The results have been gratifying but it is still not possible for the members of the staff to engage in as much research work as they should, because they teach a much larger number of students per individual than the chemistry faculties of our best institutions.

The studies offered to undergraduate students have undergone careful revision during the past biennium. The facilities of the new building have enabled the department to meet the demands that have come upon it as a result of the rapid increase of student enrollment. The following is the number of students enrolled in chemistry classes in the fall semesters of the past few years: 1910, 585; 1911, 942; 1912, 1,220; 1913, 1,502; 1914, 1,757; 1915, 1,621. (Decrease in 1915 was due to the fact that two large classes of 250 students were shifted from the fall to the spring semester.) The total enrollment in the different classes was 3,040 for the college year 1914-15, and 2,825 for the year 1915-16.

At the close of the college year in June, 1914, the Department was occupying recitation rooms and laboratories in eight different buildings on the campus. This was due to the fact that the old chemistry building had burned the year before and the new chemistry building was not yet completed. The department moved into the new building during registration week at the opening of the school year in September, 1914. It was found necessary to use temporary equipment in all laboratories except one. One laboratory was partly equipped, permanently, with the eight laboratory tables used in the emergency building constructed for chemistry work. During the biennium about $27,000 worth of permanent laboratory equipment of a very substantial grade was installed. This was sufficient to accommodate only a comparatively small percentage of the students needing laboratory tables, but it greatly increased the efficiency of those using them. On account of the fact that the department has a very large student enrollment which has been increasing rapidly, and of the additional fact that in March, 1913, almost the entire equipment of the department was lost by fire, it will be necessary to increase the equipment fund very materially for the coming biennium.

Applied Economics and Social Science.

The faculty of this department consists of Professor J. E. Brindley, Associate Professor G. H. Von Tungeln, one additional associate professor, one instructor, and one fellow.

This department has been housed during the biennium in Central Hall. There is urgent need for additional office room. Four men in the department are now occupying the same small office. It has been necessary, also, to find recitation rooms for some of the larger sections in rural sociology in other buildings. It is to be hoped that additional room may be secured before the opening of next year.

The work of the department has been materially modified and strengthened during the past biennium. Several general studies have been dropped and their places taken by studies in agricultural economics, highway economics, rural sociology, etc. A high degree of co-ordination with the work of the technical departments of the institution has been reached in the work of this department.

There has been some demand for graduate work in this department, particularly in the lines of rural sociology and agricultural economics.

The number of student enrollments in the different classes of the department was 680 in the college year 1914-15, and 846 in 1915-16.

English.

The faculty of this department consists of Professor A. B. Noble, head; two associate professors, four assistant professors, and ten instructors.

The work of the Department of English is mainly in composition. This predominance of composition work is in harmony with the spirit of the college. It includes the training of students not only to know things along technical lines, but also to express that technical knowledge. With the growing emphasis on all kinds of club work and social movements, it becomes increasingly important that the man who knows what his fellows do not know, should be able to communicate that knowledge. Hence the necessity of having thorough courses in composition in a college like this.

In order to give as much emphasis as possible to practice in writing on technical topics, one group of teachers meets the agricultural students; a second group meets the engineering students; and a third group, the students in home economics. This division enables the teachers to make a special study of technical topics in these respective fields and to direct and assist the students to write on such topics. This adjustment involves certain new problems in composition, the final solution of which will require some time. The number of enrollments in the classes in the department was 1,966 in the college year of 1914-15 and 1,960 in 1915-16.

History and Psychology.

The faculty of this department consists of Professor O. H. Cessna, head; one associate professor, one assistant professor, and one instructor. Professor Cessna also acts as chaplain.

In both history and psychology the studies given are adapted to the type of education for which the institution stands. The studies in history are mainly those of applied history, such as economic history of agriculture, industrial history of the United States and England, The Western Movement, and the history of tariff and transportation.

The studies in psychology are those which are closely associated with the work of the college, being required in the courses in agricultural education and home economics, and being also given as contributing studies for economics, sociology, etc.

The number of enrollments in the classes in the department was 672 in the college year of 1914-15 and 896 in 1915-16.

Library.

The Library staff consists of a librarian, one reference librarian, one cataloguer, and eight assistants. Miss Vina E. Clark, librarian, has resigned, effective September 1, 1916, and in the coming biennium the staff will be reorganized.

In the last two years, 9,880 books have been added to the library. The seeming smallness of the above figures may be explained by the fact that a considerable part of the available income was put into sets of periodicals and transactions. This policy was adopted about eight years ago, and it has been most satisfactory, as it is bringing within the reach of our research workers material they have needed badly.

Two departmental libraries, the Chemistry and the Veterinary, have been opened in the last biennium. A messenger service between the libraries and the college departments was inaugurated this year, with most satisfactory results.

The most urgent need of the library at the present time is a new adequate library building, even though the departmental libraries are still maintained. The main library should be removed from its unsatisfactory quarters in Central Hall to a modern, well equipped structure.

Mathematics.

The faculty of this department consists of Professor E. W. Stanton, head (does not do actual teaching), Professor Maria M. Roberts, four associate professors, one assistant professor, five instructors, two one-half time instructors and one assistant.

A number of the instructing force give considerable time to college work outside of department duties. Much time, too, is given to helping students outside of the classroom. The hours per week of actual instruction in the classroom average about sixteen per instructor; the student hours taught by each instructor approximate two hundred and eighty. The character of the work taught covers a wide range advancing gradually from elementary algebra to Theory of Functions and the more difficult applied mathematical subjects. The enrollment in classes is naturally large in the lower work and decreases to a small number in graduate courses.

The most urgent need of the department is additional room. The recitation rooms are all in use and in the fall term the department is obliged to get accommodations outside. A room should be provided which can be used by teachers in meeting students for personal work. Not taking into account any increases in the present enrollment, two additional recitation rooms will be sufficient. Two new offices are also needed. The department has at present one large and three small offices to accommodate sixteen instructors.

The enrollments in classes in this department during the college year 1914-15 were 1,441, and in 1915-16, 1,419.

Military Science and Tactics.

The military work is in charge of General James Rush Lincoln and an officer detailed by the United States Government. They are assisted by student officers.

During the past biennial period the Department of Military Science and Tactics has been as successful in its work as could be expected under existing conditions, being handicapped by lack of proper quarters.

The cadet camps of the two years just passed have given opportunity for the application of the principles taught on the drill grounds and in the classroom, and have added to the general interest of the cadets in the military work.

During the coming year, the sophomore class will be added to the cadet corps. This will nearly double the number of cadets. It will open greater opportunities for more extended instruction and will necessitate larger quarters for the accommodation of the corps. In the matter of target practice, a still greater need has to be met. The present gallery permits only two men at the "firing point" at one time; so, in spite of the fact that the gallery has been in use four or five hours each day, it has been impossible to instruct all in the principle of rifle practice.

The department is greatly in need of suitable quarters for drill purposes. As soon as bad weather sets in, little instruction in drilling can be given. Therefore, it is not possible to do the most efficient work.

The number of class enrollments in this department w [illegible],489 during the college year 1914-15, and 1,478 in 1915-16.

Modern Languages.

The faculty of this department consists of Professor Fletcher Briggs, head; and six instructors.

The department is housed in Central Hall. There is much need for additional room, both for classes and for offices. The present crowded condition cannot well be relieved in this building until the removal of the Library from its present quarters.

There has been careful review of the courses offered by this department during the past biennium, in an effort to restrict subjects to those which should be given in an institution of this type. The work of the department has been materially increased by the requirement that all graduate students prove to the satisfaction of the head of the Department of Modern Languages that they possess a reading knowledge of either French or German, or both, before being admitted to candidacy for an advanced degree.

An examination of the subjects taught in this department will show that an unusual proportion are intended, primarily, for the use of students who wish to secure a reading knowledge of scientific or technical literature in some particular field of work.

The student enrollment in the classes of the department was 674 in the college year 1914-15, and 664 in 1915-16.

Music.

The faculty of this department consists of Associate Professor J. C. Harris, head; and two instructors. Only $1,300 is paid out from college funds for the salaries of the staff, the remainder being paid from receipts by the Music Council.

As at present organized, the department has for its primary purpose the development of a liking for music and an appreciation of good music in the student body. With this in mind, glee clubs, bands, orchestras, choruses, etc., have been organized in an effort to give as large a proportion of the students as practicable some training in music. The Music Department works in active co-operation with the Music Council, which has charge of all musical entertainments and under whose auspices excellent concert series have been given each year.

The number of enrollments in the classes of the department was 303 in the college year 1914-15, and 204 in 1915-16.

Physical Training.

The faculty of this department consists of Professor Clyde Williams, chairman; one associate professor, three assistant professors, and two instructors. Only about one-half of the salaries of the staff is paid from college funds, the remainder being paid from receipts of the Athletic Council.

A physical examination is made of all freshmen, and special corrective work prescribed for those found deficient in any part or organ of the body. Serious conditions are referred to the College Physician; and in cases of more serious heart conditions, specialists are consulted. Permanent excuses are granted only by the College Physician, and these are exceedingly rare.

The facilities for taking care of outdoor work are inadequate. The play field is in no condition for use and there have been no tennis courts controlled by the department. In addition to the Intercollegiate Field, the department should have five football fields, seven baseball fields, and twenty tennis courts, the football fields to serve both football and soccer.

In February, 1915, Dr. C. G. Lang, who had been in charge of gymnasium work, died. Mr. Bode, a senior in the college, acting as an instructor, helped carry the work through the remainder of the year.

In the fall of 1915 an additional study in coaching was provided. This includes football, track and basketball; and is intended to fit the student for handling grade or high school athletics.

Beginning with 1915-16, swimming was required; that is, each freshman had to pass a certain test before grade for Physical Training 1 and 2 was given. Instruction in advanced strokes, life saving and rescue work was given to sophomores.

It might be well to note that each year adds to the popularity of the building and conveniences. More and more of the students are using the building for exercise not required by the different subjects offered.

The number of enrollments in the classes of this department during the college year 1914-15 was 3,025, and in 1915-16 the number was 4,158.

Public Speaking.

The faculty of this department consists of Associate Professor Fredrica V. Shattuck, chairman; two instructors, and one part-time assistant. The department is housed in Central Hall.

During the past biennium, this department has made material progress in its work of giving technical students criticism and practice in public speaking. The members of the department have also given much personal training in debates, speeches, readings, plays and other public performances. During the past year, particular emphasis has been placed upon the training of students for extemporaneous speaking and for the making of demonstrations and the giving of club talks. Considerable attention has also been paid to the selection of and the coaching for plays useful in rural social center work.

The number of enrollments in the classes of the department was 429 in 1914-15, and 537 in 1915-16.

Zoology.

The faculty of this department consists of Professor H. E. Summers, head (on leave of absence on account of illness); Associate Professor J. E. Guthrie, acting chairman; one associate professor, three assistant professors, two instructors, one one-half time assistant, and three fellows.

During the biennium just closed, the Department of Zoology has greatly missed the services and counsel of Professor H. E. Summers, whose health has been such as to occasion his absence from the department since October, 1914.

The difficulty of carrying on the work in several different buildings has been considerable and has interfered to some extent with efficiency in the use of illustrative materials for laboratory and lecture use in the different classes. However, the laboratories in the Chemistry Building and the Emergency Building have been a great improvement on the basement rooms formerly used in Morrill Hall.

Work in Apiculture (Zoology 37) has been offered since the fall of 1914. The work in Entomology has been strengthened.

The growth in attendance and interest in the weekly Zoological Seminar, a purely voluntary organization of the members of the Department, has been very encouraging.

The department is looking forward to the beginning of the new year, when part of its work will be moved into the new Science Building now being erected. It is hoped that the time is near when still more adequate quarters may be provided; so that the entomological work, which must remain in the Chemistry Building, may again be housed with the rest of the department; so that the entomological collections may be moved to rooms in the new Science Building; and so that provision may be made for the general museum which must be left for the present on the top floor of Morrill Hall. It has been a matter of regret that the lack of room and of funds has prevented the expanding of the museum in keeping with the growth and development of the college and of the department.

The number of enrollments in the classes of the department was 916 in the college year 1914-15, and 832 in 1915-16.

VETERINARY MEDICINE.

The Division of Veterinary Medicine showed a decrease in attendance during a few years after the entrance requirements were placed on the same level as those of the other divisions of the college. The enrollment now is increasing. The numbers of freshmen entering during the last four years were 31, 33, 36, and 46 respectively. A large amount of work falls on the faculty of this division, in connection with the diagnosis of diseases of specimens received from all parts of the state. This is referred to especially in connection with the report of veterinary investigations, but it is a task that is shared by most of the members of the Veterinary staff.

As a country becomes older in its settlement, and as population increases, diseases of animals also increase unless more and more care is taken to prevent them. Instruction in the Veterinary Division is given with a view to practice in Iowa, but occasionally a graduate finds employment in a veterinary commercial enterprise, in special research work or in the United States Bureau of

Animal Industry. This is to be expected and should be encouraged within reason.

Dean Chas. H. Stange is temporarily absent from the college on account of illness, and his duties are being performed by Vice-Dean H. E. Bemis with the aid of other members of the staff.

Acting Dean Bemis reports as follows:

Special attention is called to the fact that members of the Veterinary staff are receiving less compensation than is received for corresponding service in other states. These men could do better, in a financial way, by engaging in veterinary practice; but they have preferred to remain in college work. Also, several members of the staff have incurred heavy expenses during the last three years by traveling and observing conditions and veterinary practice elsewhere, and by spending vacation time in study at other institutions or by working on special problems in their own laboratories. This was done in order to further perfect their training along special lines.

The work of the Veterinary Division is divided between five departments, namely: The Department of Practice and Diagnosis which is in charge of the Dean; The Department of Anatomy and Histology in charge of Professor H. S. Murphey; The Department of Pathology and Bacteriology in charge of Professor W. W. Dimock; the Department of Physiology and Pharmacology in charge of Associate Professor H. D. Bergman; and the Department of Surgery and Obstetrics in charge of Vice-Dean H. E. Bemis.

In connection with the department of Practice and Diagnosis, an Ambulatory Clinic is maintained, which, during the college year 1915-16, handled 4,887 cases, 254 of this number being surgical cases. The above cases were found among the various species of animals as follows: Horses 390, mules 5, cattle 614, swine 3,799, sheep 4, fowls 75. The Ambulatory Clinic is under the direction of Dr. N. L. Nelson, and has been a great success. No other one thing could be added which would be of more direct benefit to the students than the Ambulatory Clinic, as all senior students are given opportunity to go out on calls under conditions similar to those in regular practice.

The Department of Anatomy and Histology gives considerable work to agricultural students, in addition to the work in the regular veterinary course. The agricultural students are getting instruction in the anatomy of domestic animals and are thus acquiring knowledge which will be of considerable benefit in connection with farm practice. The department is doing a great deal of work in the collection of specimens for use in classwork. A large number of specimens have been added to those already available, and by rearrangement and classification, all have been made accessible to the students.

The Pathology and Bacteriology Department is perfecting the study in Food Hygiene in an attempt to make it suitable to the use of graduates in whatever line of work they may take up. The chief purpose of meat inspection is to protect the people against the dangers which threaten from eating infected meat. Although great progress has been made in the inspection of meat, much still remains to be done, as is shown by the fact that many cases of sickness, and even death, from eating diseased meat continue to occur. The question of animal parasites is given special attention, because of the economic importance of the question. Stockmen and veterinarians have pointed out the necessity of devoting all the time possible to the study of methods of control of animal parasites.

Serum Therapy is one of the newer subjects of Pathology and Bacteriology, and is being given considerable attention. In many cases, treatment with serum is the only satisfactory method of treating and preventing diseases. So far, the results of serum treatment have been wonderful, and the possibilities are untold. This department also gives considerable work to agricultural students in addition to the regular work required in the veterinary course.

A number of changes have been made in the undergraduate work of the department of Physiology and Pharmacology. The manner of the presentation of the work has been improved by the allowance of additional time for laboratory work, and the scope of the work has been materially broadened. The department offers both major and minor graduate work, which has been taken up by industrial science and agricultural students. The department has at all times kept in touch with the newer developments along pharmacological lines and therapeutics, and by field and laboratory experiments has tested out the value of a number of the newer theapeutic agents. A large amount of co-operative work has been carried on with livestock owners and veterinarians throughout the state. Through such co-operative work, considerable valuable data have been obtained on certain practical methods of control and treatment of diseases by therapeutic measures.

The work of the Department of Surgery and Obstetrics is given largely by clinical instruction. The amount and the variety of work are indicated by the following data showing the kinds and number of diseases treated. Infectious diseases, 72; respiratory diseases, 17; digestive diseases, 122; nervous diseases, 24; skin diseases, 16; circulatory diseases, 9; Genito-urinary diseases, 54; diseases of the eye, 20; miscellaneous, 15; diagnostic tests, 267; mouth diseases, 149; nose, nostrils and sinuses, 6; face and mandible, 14; ear and guttural region, 25; eye and lids, 9; poll, 17; neck, 5; larynx and trachea, 3; thorax, 6; abdomen, 64; genito-urinary organs, 165; fore limb, 117; hind limb, 76; foot, 61; autopsies, 113. These cases were distributed among horses, mules, cattle, swine, sheep, dogs, cats and fowls.

Aside from the clinical material which was used in making plain the principles taught in the classroom, the department is continuing to collect and preserve specimens. The history of these specimens is carefully kept, and the material is numbered and indexed and placed in the museum of the department where it can be readily secured for classroom use.

The Veterinary Division is in need of additional space. The completion of the southwest wing of the veterinary group is earnestly recommended. Buildings for the disposal of refuse and for the housing of small animals are also greatly needed. An additional story is needed for the Pathology and Anatomy buildings to relieve the pressure in these departments. A laboratory building for the production of biological products should also be provided.

A farm of about 160 acres is needed for caring for clinical material and research work and serum production. Future work of such character and quantity as is now carried on at the college could be handled with distinct economy by a plant of this kind.

GRADUATE WORK.

The graduate work has continued to develop rapidly. This is largely due to the fact that in selecting teachers, high standard institutions give preference to persons who have completed graduate courses of study. Another explanation lies in the fact that graduate students are attracted here because some of our departments are well provided with equipment and teachers. There is an advantage to the student in selecting for his graduate work an institution different from the institution where his under-graduate work was taken; thus, while some of our graduates go to other states for their special advanced studies, a number of graduates from other states come here. Their presence is a distinct help to the college. It brings into our midst a group of very high class young men and women. Their presence and example have a good influence upon the entire student body and are a help also to the faculty.

The Board of Education has now granted permission here, which long has been enjoyed in other institutions, whereby instructors and assistants are permitted to take a limited amount of graduate work. The rule of the Board adopted April 23, 1914, is as follows:

Whereas: It is frequently possible to secure a teacher or investigator of unusually high qualifications for less salary than his services are really worth, if opportunity is given him to pursue studies along his chosen line leading to an advanced degree:

Therefore, Be It Resolved: That the members of instructional and investigational force of rank of instructor and assistant be permitted to do graduate work; those on half-time employment may receive not to exceed two-thirds time credit, and those on full time may receive not to exceed one-fourth time credit; all adjustments as to the amount of credit to be allowed, to be made between the Head of the Department in which the work is taken, and the Dean of the Graduate Division.

This rule does not have the effect of decreasing the efficiency of the teacher. On the contrary, it stimulates his interest and it enables the college to secure instructors and assistants at lower salaries than would otherwise be possible. In addition, it helps these young teachers to continue their studies for advanced degrees. The rule of the Board results in the college's securing better teaching service without increased cost.

The staff should be strengthened by the appointment of a dean and the addition of at least three scientists who would devote a considerable portion of their time to the instruction of graduate students.

Further references to graduate work are made in the statements on collegiate work.

NON-COLLEGIATE WORK.

Non-collegiate courses are offered in agriculture, home economics and trade school work. The enrollment in these courses in recent years has increased steadily. It was 149 in 1910-11, 188 in 1911-12, 218 in 1912-13, 321 in 1913-14, 365 in 1914-15, and 327 in 1915-16. This shows an increase of more than 100 per cent in five years.

The enrollment responds quickly to general economic conditions throughout the state. It is influenced also by the development of extension work and the introduction of agriculture, trade school work, and home economics into the public schools. Some special vocational schools during the winter season are another factor affecting attendance in the non-collegiate work. It is not to be expected, however, that these other agencies can replace the non-collegiate courses continued for two years as offered at this college. These courses fill a distinct need and they should be continued and strengthened and given wider publicity. Very many people who would be benefited by them do not know of their existence. They are adapted to young men of seventeen years of age and young women of eighteen years of age who have finished the eighth grade in the public schools but have not finished an accredited high school. Two and four year courses are open to the latter.

The work given in these courses is intensely practical. The best college equipment is available, and the instructors are on a par with instructors in collegiate courses. The young people who finish these courses, or even take one year of the work, put their instruction into direct use. For example, practically every student in the agricultural work returns immediately to the farm. Some, however, prefer to engage in teaching. To the list of studies offered, there should be added non-collegiate work in education, which would be of high value to students wishing to prepare to teach vocational subjects, especially in the rural schools.

CHANGES IN TEACHING STAFF.

The following appointments, resignations, leaves of absence, and promotions have occurred in the staff of the non-collegiate departments during the biennium:

Appointments.

R. Burdette Dale, Assistant Professor in charge of Vocational Courses in Engineering and Correspondence Instruction.
Myrtle Ferguson, Supervisor of Home Economics.
Vincent Chappel, Instructor in Dairying.
A. B. Campbell, Instructor in Electrical Engineering.
Austin A. Dowell, Instructor in Animal Husbandry.
Edna Bell Fry, Instructor in Chemistry.
Herbert E. Freund, Instructor in Vocational Courses.
Peter Hanson, Instructor in Agronomy.
Joan Hamilton, Instructor in Home Economics.
Annie Hawkes, Instructor in Home Economics.
W. H. Lancelot, Instructor in Chemistry.
Mary Miller, Instructor in Mathematics.
Mrs. Edwin S. Youtz, Instructor in English.
W. R. Little, Instructor in Mechanical Engineering.
Walter Lott, Assistant in Botany.
Amy Middleton, Assistant in English.

Resignations.

Mogens R. Tolstrup, Assistant Professor in Dairying.
R. Burdette Dale, Assistant Professor in Vocational Courses.
Harry C. Cameron, Instructor in Agricultural Engineering.
Herbert E. Freund, Instructor in Vocational Courses.
Joan Hamilton, Instructor in Home Economics.
Mary Miller, Instructor in Mathematics.
Anna Mary Wolfe, Instructor in Bacteriology and Botany.
Earl B. Bisbee, Instructor in Dairying.
Helen H. Halm, Instructor in Home Economics.
Beatrice Hunter, Instructor in Home Economics.
Robert C. McChord, Instructor in Animal Husbandry.

Leave of Absence.

Elizabeth Maclean, Professor of English.

Promotions.

Professors, Associate Professors and Assistant Professors in Sub-Collegiate Work.

Elizabeth Maclean from Associate Professor to Professor of English.
Mark G. Thornburg from Associate Professor to Professor of Animal Husbandry.
Henry Louis Eichling from Assistant Professor to Associate Professor of Agronomy.

Paul Revere Lisher from Assistant Professor to Associate Professor of Animal Husbandry.

Claude Kedzie Shedd from Assistant Professor to Associate Professor of Agricultural Engineering.

Instruction is given in certain fundamental subjects for all of the technical non-collegiate courses. These subjects include English and chemistry. The work is of lower grade than collegiate work and is given in classes separate from collegiate classes. The classes, however, meet in the regular college buildings, occupying regular college class rooms when not occupied by four-year classes.

AGRICULTURE.

There is a two-year non-collegiate course in agriculture and a one-year course in dairying. These are designed to give scientific training and practice. Instruction is given in animal husbandry, agricultural engineering, soils, farm crops, farm management, horticulture and dairying. The general plan of instruction is similar to the plan followed in four-year courses, but the work is not so difficult and it is not presented so rapidly. It is adapted to the immediate needs of Iowa. Instruction is given that will assist in dealing with farm problems which arise daily. Young men who have finished this course are now giving a good account of themselves on many Iowa farms.

HOME ECONOMICS.

This course aims to dignify all occupations of the home by showing their relation to science and good taste. The training is such as is needed by young women who would obtain positions as managers of tearooms and cafeterias or who would secure employment as dressmakers, milliners, and demonstrators. The enrollment in this work has doubled in one year, showing that it fills a real need. It is proposed, as soon as possible, to give instruction in institutional management and to offer a one-year course for women who would be given opportunity to take it one semester or one-half of a semester at a time.

ENGINEERING AND TRADE SCHOOL WORK.

In this field the work is referred to as two-year vocational courses in engineering. These courses are planned to prepare young men to be electrical workers and stationary engineers, mechanical engineers and mechanicians, structural draftsmen and building superintendents, and surveyors and road makers. Arrangements now have been made to add a one-year course for telephone plant men and a six-months course for automobile mechanics. These courses are enabling young men to qualify themselves for technical work of an important character, such as they could not easily learn in other ways. In a small way, they are doing for young men of Iowa what the educational system of Germany has long been doing for the young men of that country. These courses are being correlated and identified more and more specifically with the industries of the state.

SUMMER SESSION.

Successful summer sessions were held in 1915 and 1916. The chief reason for starting these sessions was to accommodate teachers who wanted to have more instruction. Gradually, college credit studies have been introduced and increased in number until now this has become a very important part of the work. The regular Summer Session continues six weeks, and a second session has been introduced. This makes practically a full year of service for the college buildings and equipment. In assigning teachers to the Summer Session, effort is made to allow reasonable vacation periods so that they will not lose the rest and change that is desirable for the best work in the classroom.

Special emphasis is given to the industrial subjects,—agriculture, home economics, and trade school work, for the benefit of teachers; and in addition to these, instruction has been offered in the common branches to a limited extent for the benefit of teachers who needed to give a small part of their time to such work on account of coming examinations.

The following is taken from the reports of Director G. M. Wilson:

SUMMER SESSION OF 1915.

In the first session 791 students, representing 94 counties, were enrolled, and in the second session 264, representing 68 counties, were enrolled. In the first session there were 68 superintendents, 27 principals, 71 high school teachers, 349 rural and grade teachers, 223 college students, 11 college instructors, 16 farmers and housekeepers, and 26 others. 14 additional college credit subjects were included in the first session, and new work was added in the rural and grade teachers' course to more fully meet the demand for certificate subjects. In the industrial subjects, work was extended so as to permit twelve weeks' work in each of the three lines. Special care was taken to see that Summer Session students did not overload themselves with work, as they are often tempted to do. It is considered that the Summer Session student should not carry, on an average, more than a regular college student in a four-year course. Some exceptions were granted, however, to persons of special training and physical fitness. Public lectures were provided, including one by Dr. W. A. Jessup of the State University of Iowa and one by Dr. W. F. Jones of the University of South Dakota. Facilities were provided for recreation. The average cost for each student during the first session was $25.08.

A rural life conference was held during this session, and was attended by nearly 200 persons, many of them rural ministers who were present for a few days.

A county superintendents' conference was held at the call of the State Department of Public Instruction. This was to enable the superintendents to come into closer touch with the new industrial subjects which the law requires to be taught in public schools. Regular work was arranged for the superintendents, and it was much appreciated.

The model school was again operated, and it proved a valuable supplement to the work given in methods of education.

In the work for rural and grade teachers, special attention was given to adapting the studies to rural conditions. For example, the home economics work was organized around a rural school home economics cabinet, a blue flame oil stove, and a homemade fireless cooker, the idea being to put the work in such form that the teachers can imitate it without change. In the manual training work, the teachers first made their work benches as they would do in their own schools. In agriculture, methods were employed which can be duplicated at home; but the superior agricultural equipment of the college was used to supplement and strengthen the instruction given to teachers.

SECOND SUMMER SESSION OF 1915.

In the second session the work given was similar to that in the first session. The attendance was small in comparison with that of the first session; but, considering that this is a new departure, the attendance was creditable. It indicated the desirability of continuing this session.

SUMMER SESSION OF 1916.

For a period, there was some uncertainty as to whether common branches should be included in the schedule of subjects for this summer session; and while the matter was in doubt, some persons who would have attended made other arrangements. The enrollment, however, for the first session was 737 from 94 counties and for the second session 261 from 69 counties. Eighteen new subjects were introduced in the curriculum of the first session, all of them being of collegiate grade. The interest in collegiate courses in the summer period showed further increase. 380 students were enrolled in collegiate agricultural studies, 324 in fundamental subjects, including botany, chemistry and bacteriology; 56 in home economics studies, and 106 in engineering studies. In some cases, students were enrolled in two or more of these main groups. The average cost of instruction during the first part of the summer session per student was $30.59. There is a wide variation between different studies. For example, the student cost per hour in agricultural education was $2.87, while in agricultural engineering it was $8.69. Too much weight should not be given to these figures, however, as they vary considerably with the changes of enrollment.

The model school was again conducted, being used regularly by students in didactics and visited by large numbers of other summer session students. A garden was conducted in connection with the model school, and superintendents and rural school teachers were given instruction and suggestions as to what can be done in this way throughout the state.

A rural life conference was conducted for two weeks with an interested group of rural ministers and others interested in rural welfare in attendance.

SECOND SUMMER SESSION OF 1916.

In the second part of the 1916 Summer Session, there were 135 men enrolled and 126 women. 185 students continued their work from the first session. Rural and grade teachers' work was taken by 114. 132 carried regular college work.

COLLEGE FUNCTIONS.

Some of the most prominent men and women of the United States have addressed the entire student body or groups of students interested in certain subjects.

At the commencement in June, 1915, the baccalaureate sermon was delivered by former President A. B. Storms and the commencement address by President F. W. Gunsaulus of Armour Institute; in 1916 the baccalaureate sermon was delivered by Rev. Burris A. Jenkins of Kansas City, Mo., and the commencement address by President W. O. Thompson of Ohio State University.

A notable series of lectures was given in March, 1916, by Ex-President William H. Taft, who spent three days on our campus and delivered one lecture each day on the general subject of citizenship. Ex-President Taft inspired and fascinated large audiences which crowded the Gymnasium, and he instructed them in some of the fundamental principles of good citizenship which are too poorly understood by citizens generally.

Following is a list of some of the prominent speakers at convocations and meetings, with the dates of their appearance.

1914-15.

Sept. 24, 1914—President of the College.

Nov. 20, 1914—Greater Iowa Day—Governor George W. Clarke and Mrs. Benjamin B. Clark, President of Iowa Federation of Women's Clubs.

Nov. 30, 1914—William A. Sunday, Evangelist.

Jan. 16, 1915—Hon. David F. Houston, Secretary of Agriculture.

Feb. 18, 1915—Hon. Raymond Robins, Chicago, Illinois.

Feb. 21, 1915—Hon. Raymond Robins, Chicago, Ill.

Mar. 10, 1915—Sherwood Eddy, New York City.

April 27, 1915—George E. Vincent, President of University of Minnesota.

May 14, 1915—B. H. Hibbard, Professor of Agricultural Economics, University of Wisconsin.

1915-16.

Oct. 29, 1915—Founders' Day—Governor George W. Clarke and the President of the College.

Dec. 4, 1915—Closing Panama-Pacific Exposition—Dean C. F. Curtiss.

Mar. 2, 1916—A. J. Elliott, New York City.

Mar. 23, 1916—Hon. William Howard Taft.

Mar. 24, 1916—Hon. William Howard Taft.

Mar. 25, 1916—Hon. William Howard Taft.

Apr. 3, 1916—W. A. Tener, Manila, P. I., and New York City.

Apr. 26, 1916—Mrs. Carrie Chapman Catt, New York City.

May 15, 1916—Hon. William Jennings Bryan, Lincoln, Nebr.

RELIGIOUS SERVICES.

The Sunday morning chapel services, with non-resident speakers, have continued to grow in interest; and the Agricultural Assembly Hall, which is the largest seated room on the campus, has become quite inadequate for these religious meetings. The speakers represent all of the leading religious denominations but the services are non-sectarian. Occasionally the platform is occupied by a layman who speaks on a religious subject. The speakers have included the following.

Year 1914-1915.

President C. M. Stewart, Garrett Biblical Institute, Evanston, Illinois.
Rev. Howland Hanson, First Baptist Church, Des Moines, Iowa.
Mr. A. J. Elliot, New York City, International Secretary, Y. M. C. A.
Dr. E. A. Steiner, Grinnell College, Grinnell, Iowa.
Professor C. E. Seashore, State University, Iowa City, Iowa.
Dr. Harry D. Ward, Boston Theological Seminary, Boston, Mass.
Rev. Everett Dean Martin, Unitarian Church, Des Moines, Iowa.
Dr. Shailer Mathews, Dean of Divinity School, University of Chicago.
Rev. E. E. Higley, Des Moines, Iowa.
Miss Mary McDowell, University of Chicago Settlement.
Miss Maud Kelsey, International Secretary, Y. W. C. A., New York City.
Dr. W. T. Elmore, Missionary from India.
Rev. J. H. Batten, Grand Forks, N. D.
Rev. Henry F. Cope, Secretary Religious Educational Association, Chicago, Ill.
Mr. Fred M. Hansen, State Secretary Y. M. C. A. County Work, Des Moines, Iowa.
Miss Ogbourne, National Secretary Y. W. C. A., New York City.

Rev. Titus Lowe, Omaha, Nebraska.
Mr. Raymond Robins, Chicago.
Rev. Father Nugent, Catholic Church, Des Moines, Iowa.
Professor Florence Richardson, Drake University, Des Moines.
Dr. Martin, Drake Theological Seminary, Des Moines, Iowa.
Dr. B. H. Hibbard, University of Wisconsin.
Dr. R. C. Hughes, Secretary Educational Board of Presbyterian Church, Madison, Wisconsin.
Dr. D. W. Wylie, Presbyterian Church, Iowa City.
Professor Julius Boraas, Evangelical Lutheran Church, Saint Olaf College, Northfield, Minnesota.
W. A. Tener, General Secretary Y. M. C. A. Manila, Philippine Islands.
Rev. Frank M. Sheldon, Secretary Educational Board of the Congregational Churches, Boston, Mass.

Year 1915-16.

Dr. E. A. Steiner, Grinnell, Iowa.
Dr. F. M. Sheldon, Boston, Mass.
Dr. Howland Hanson, First Baptist Church, Des Moines, Iowa.
Dr. Richard C. Hughes, Secretary, University Work, Presbyterian Church, Madison, Wisconsin.
Mrs. McCleary, Missionary from Western Africa.
Dr. G. D. Crissman, First Methodist Church, Boone, Iowa.
Dr. C. S. Medbury, Christian Church, Des Moines, Iowa.
Pres. W. L. Bryan, Indiana University.
Rev. Wm. Hints, Methodist Church, Osceola, Iowa.
Dr. Shailer Mathews, Dean Divinity School, University of Chicago.
Archbishop James J. Keane, Catholic Church, Dubuque, Iowa.
Bishop Beecher of the Episcopal Church.
Prof. H. F. Rall, Evanston, Illinois.
Dr. F. M. Sheldon, Boston, Mass.
Prof. Adrian M. Newens, Des Moines, Iowa.
Miss Emma F. Byers, District Executive Y. W. C. A., Minneapolis, Minn.
Dr. A. B. Storms, Indianapolis, Indiana.
Prof. T. N. Carver, Harvard University.
A. J. Elliott, International Secretary Y. M. C. A.
President Ozora Davis, Chicago Theological Seminary.
Rev. Sears Thomson, Hibbing, Minn.
President C. W. Flint, Cornell College, Mt. Vernon, Iowa.

MUSIC.

It is worthy of special note that the students of Iowa State College have been given unusual opportunity to hear musical events of the highest quality, and that they have responded in such large numbers as to indicate their great appreciation of these entertainments.

During the year 1914-15 the following musical attractions were offered.

October 15—U. S. Marine Band.
December 12—Maud Powell, violinist.
March 20—Julia Culp, Lieder-singer.
May 7-8—First Annual Music Festival. David Bispham, baritone; New York Symphony Orchestra.

And in 1915-16 the program included the following:

October 29—Evan Williams, tenor.
January 14—Louise Homer, contralto.
March 10—Mischa Elman, violinist.
May 5-6—Second Annual Music Festival. Anna Case, soprano; New York Symphony Orchestra, and Josef Hofmann.

On account of the very large attendance in the college gymnasium, the Musical Council has found it possible to make the prices for these musical events almost nominal and yet pay all expenses from door receipts.

INTERCOLLEGIATE ATHLETICS.

The supervision of this branch of student affairs is entrusted to the Athletic Council. Under special action by the Board of Education, this college co-operates with other institutions belonging to the Missouri Valley Conference; and the status of athletic affairs generally is highly satisfactory. Strong emphasis is placed on honorable sportsmanship.

The Athletic Council has carried out a great task in erecting concrete bleachers on the athletic field at a cost of about $32,000, and nearly this entire amount has been paid off with the help of gate receipts, alumni contributions, and the assistance of students, citizens of Ames, and others.

ALUMNI BUREAU.

The Alumni Bureau, under the secretaryship of Professor Ward M. Jones, is performing a valuable service by helping to keep the college in touch with its alumni. Last year, under the presidency of J. W. Hook, '05, a campaign was successfully carried on among the alumni to wipe out an old debt that had long hampered the work. The office of the Alumni Association is in Alumni Hall, the headquarters of graduates of the institution. It is confidently hoped that the alumni of this college will become better organized and will assist even more generously in supporting the college work, as is now being done by the alumni of other older institutions.

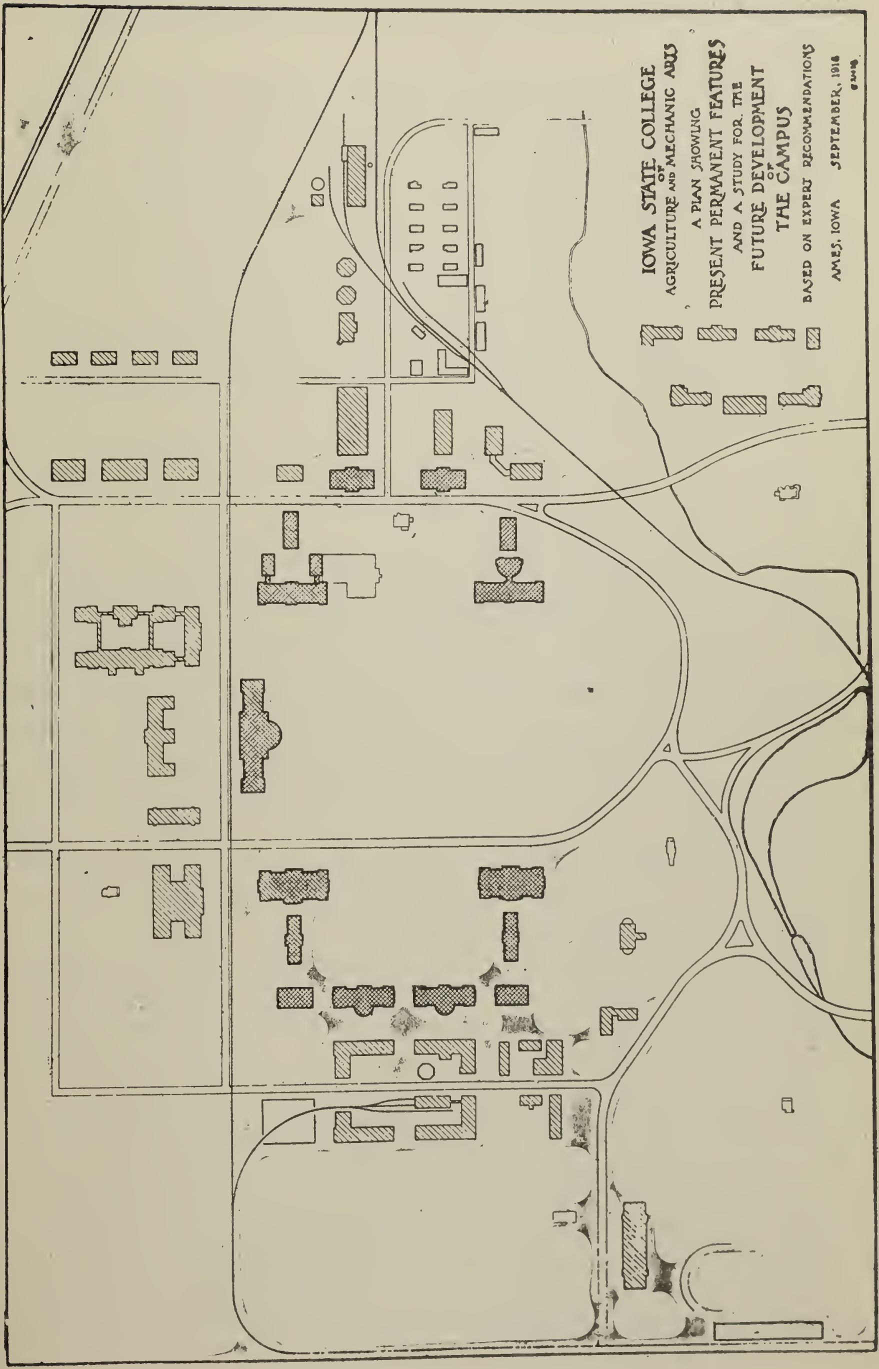
THE CAMPUS.

With the aid of Mr. O. C. Simonds, the eminent landscape gardener of Chicago, whose services have been furnished for two years by Dr. LaVerne W. Noyes, '72, of Chicago, much improvement has been effected on the campus. The new planting around the buildings and at various places on the grounds, especially in the vicinity of the new lake, is now making itself felt. The work began in the spring of 1915, and during the season conditions were excellent for transplanting and growing. The work was continued through the season of 1916, but growth was checked on account of dry weather. Dr. Noyes has offered to continue the services of Mr. Simonds another year.

Lake LaVerne, donated by Dr. Noyes, who placed $10,000 at the disposal of the college for the construction of this lake, adds greatly to the beauty of the grounds. It has been named in honor of the donor. It is situated in the valley of College Creek, with the foot of the lake near Boone Street and opposite Lynn Avenue. The lake covers about three and one-half acres. Besides affording a delightful change in the landscape, it furnishes a much needed place for skating, and its facilities are fully appreciated by the student body. Resolutions of appreciation on account of the generosity of Dr. Noyes have been adopted by the Board of Education, the College Faculty, Alumni groups, and the Student body.

A campus map, showing a complete and permanent group of buildings, has been prepared after much discussion. The arrangement shown seems to represent important features in a satisfactory way.

This map is not intended to represent the arrangement of the campus in the near future. It is intended merely as a guide for development. Buildings that are not fireproof are not considered. Locations are indicated, but size and form of future buildings are not definitely fixed, and even locations may be varied somewhat without interfering with the essential features of the plan. The main feature is the central campus, surrounded on three sides by stone buildings symmetrically arranged. Outside of this line of stone buildings, there are fireproof brick buildings to house numerous departments, laboratories, pavilions, barns, shops, etc. It


IOWA STATE COLLEGE
OF
AGRICULTURE AND MECHANIC ARTS
A PLAN SHOWING
PRESENT PERMANENT FEATURES
AND A STUDY FOR THE
FUTURE DEVELOPMENT
OF
THE CAMPUS
BASED ON EXPERT RECOMMENDATIONS
AMES, IOWA
SEPTEMBER, 1916

is intended to use the present non-fireproof buildings as long as possible.

The "North Road" referred to in my last report is now completed and in use. The road adjacent to the Chicago and North Western Railway right-of-way from the North Road east to Squaw Creek, is fenced; but construction work is not yet started. The service road running north and south between the engineering shops has been put in good order with concrete curbs, and a new service road approaching the Dairy building from the north now replaces the old awkward and unsafe approach from the south. The permanent campus plan shows a new location for the street car line crossing the campus, bringing the track to an east and west line instead of a diverging line as at present.

BUILDINGS AND LAND.

BUILDINGS.

Soon after the beginning of the biennium, the Chemistry building, the Plant Propagation Building and Greenhouses, and the first of the new group of dormitories for women were finished. These buildings were occupied during the year 1914-15, but the dormitory was not ready for use until the second semester. These buildings have come up to expectations; they are creditable to the architects, Proudfoot, Bird & Rawson; and they have been well built by contractors under the general supervision of Superintendent Thomas Sloss.

The Dairy building has been practically enlarged by having its top or attic floor finished and partitions built; and thus a large, well-lighted room is made available.

The Engineering Annex has been improved by having its attic, which was formerly used as storage space, put into suitable condition for physics laboratories, thus relieving considerable pressure on Engineering Hall.

The Science building was practically completed during the biennium. This building, however, is intended to constitute less than half of a structure to be devoted to fundamental science instruction. The portion of the building erected was limited in cost to $65,000. Unfortunately, the contractor on this job failed, and the building was finished under the direction of the Superintendent of Buildings. The Science building is a plain brick structure, fireproof throughout, and excellently lighted and ventilated. The portion of the building now in use is about 52 feet wide by 114 feet long, and has four floors.

A second dormitory, also, was practically finished during the biennium. This is located east and slightly north of the dormitory finished the preceding year, and is built on the same general plan. Both buildings are Colonial style. The second dormitory accommodates 93 young women and has a guest room for parents, an accommodation that has been greatly needed. These dormitories seem to represent the maximum of economy, and it is desirable that at least some of the buildings in the group shall accommodate smaller families of young women, even though the per capita cost is slightly increased. Considerable increase could be made without bringing the per capita cost of construction as high as obtains at other institutions in the state, or as high as is common in eastern institutions. The cost of this dormitory was limited by legislative action to $60,000, and the contract called for slightly less than this amount. The contractor, however, failed; and the job was finished in a creditable manner by the Superintendent of Buildings.

New bleachers constructed of reinforced concrete have been built on the west side of the athletic field. Funds for this purpose were contributed by alumni, faculty members, and students, the total cost being about $32,000. About $3,000 of this amount was paid from the unexpended balance of the Student Repair Fund, in accordance with the wishes of the Cardinal Guild.

The state has purchased the residence belonging to Professor O. H. Cessna and temporarily rents it to a member of the staff. Eventually the house will need to be moved to a different location to make place for a dormitory building.

Three cottages located in different places on the campus have been moved to sites opposite the power plant, where it is intended to have a group of houses for the engineer in charge of the power plant, the herdsmen and others whose duties require them to live on the campus.

A horse barn has been erected on the Dairy Farm at a cost of about $4,300. It provides space for horses and farm machinery and has a commodious feed storage room.

Provision has been made for building an addition to the experimental feeding shed and for the erection of a corn crib and a scale house. A temporary structure costing about $1,600 will be provided for the Department of Military Science and Tactics before the opening of the next college year, and a fund of $2,000 has been set aside for a small animal building for the Animal Husbandry Department.

A new water filtration plant is practically finished, there being a slight delay in the installation of the equipment. This plant is expected to furnish clear water at all times. In the past, at frequent intervals, the water has been chocolate colored on account of the large amount of iron in suspension.

Plans are completed for the construction of four additional buildings which will be started before winter, namely: A Hospital at a cost of $35,000; an Animal Husbandry Laboratory building at a cost of $50,000; a dormitory for women at a cost of $45,000; and a Dairy Barn at a cost of $18,000. It may prove desirable to slightly change the costs of these buildings from the amounts mentioned, which in two cases are below the allowances authorized by the legislature.

Additional new buildings which are greatly needed include the following: Library, Home Economics building, Physics building, Auditorium, Dormitories, Addition to Dairy building, Beef Cattle barn, Drill Hall, Coliseum, Addition to Veterinary buildings, Shop and Storerooms, Agronomy building and Practice School.

LAND.

It might seem that the college has sufficient land for all purposes, but it should be remembered that much of this is subject to overflow, that a large area is covered by woods, that the best of the land is occupied by the main college campus, and that the college has unusual needs for land because of the nature of the instruction. Additional land is needed, and should be purchased at this time before prices are higher. An Animal Husbandry Farm of at least 200 acres should be purchased in the vicinity of the college to provide pastures and barn room and meadows and tillable fields for the college livestock. Suitable accommodations are not now available, and the livestock, as well as instruction and experimental work, is suffering on this account. The cost of a suitable farm with equipment would be $75,000.

A Horticultural Experiment Farm costing $12,000 is desirable, so that horticultural experiments may be carried on under climatic conditions different from those at Ames. The famous Charles G. Patten farm at Charles City is available and the college holds an option upon it. The purchase of this land is strongly recommended so that the state may come into possession of land in a suitable location, and, above all, so that it may acquire the large amount of experimental material which Mr. Patten has developed. This land and some necessary permanent improvements would cost $12,000.

Additional land is needed near the campus for dormitory purposes. Through friends of the college, options have been secured on lots adjacent to the campus, the total cost amounting to $43,250. The value of this land is rising constantly, and it would be an economy to the state to take it at this time. The purchase would be an investment, as the property could be disposed of on good terms if this is desirable later.

A Veterinary Research Farm also is needed. Its cost would be about $32,000, and it would be used for experimental work along veterinary lines, for the making of biological products, and for clinical material.

EQUIPMENT.

A detailed statement concerning purchases of equipment is contained in the Secretary's report.

Much additional equipment is needed to replace that which is no longer useful and to provide facilities that are up-to-date in the older as well as the newest departments. It has been the custom to purchase equipment from the Support Fund, especially the portion of this fund not included in regular salaries and expenses during the first year of the biennium; and in recent years the amount thus available has been supplemented by special equipment appropriations. If it is desired to restrict equipment purchases from the Support Fund, obviously the special equipment appropriation should be increased. At the present time there are in the President's office requests for much needed equipment amounting in value to more than one hundred thousand dollars, and new needs are being reported almost daily. It is well known that equipment in commercial enterprises has to be renewed because of inventions and improvements constantly being placed upon the market. Of course the educational institution is subject to the same expense, as it does not do to retain equipment for instruction purposes long after similar equipment has been discarded by practical men, except occasionally a piece which is kept for its historical value. We have not yet finished equipping the new Chemistry Building, and some of the laboratories are still using rickety tables and insecure cupboards, neither of which contributes to good laboratory work or to safety of apparatus. It was decided to spread the expense of the new Chemistry Building equipment over several years, and good progress is being made in carrying out this plan.

Much could be said about the need of better library facilities. Reference books are necessary where science is taught and where problems are investigated. Many books and other documents must be purchased to enable us to keep in touch with the progress made elsewhere. At the present time, library books are being borrowed from several different states and at considerable cost for transportation of the books to and from Ames. While it is a benefit to us to have generous friends in other states who are willing to loan their books, yet this is not entirely satisfactory because of delays incurred. Instead of $5,000 annually for the library, $20,000 could be used to advantage.

During the biennium the Engineering Division received as gifts some noteworthy additions to its equipment. The Chicago & North Western Railway presented the division with a locomotive for use in instructional work in the locomotive laboratory; the Midvale Steel Company, of Philadelphia, Pennsylvania, presented the division with eight supporting wheels which carry the locomotive being tested in the locomotive laboratory; and in the spring of 1915 the Chicago & North Western Railway gave the students in Railway Engineering the opportunity to make tests of railway trains in actual operation by loaning their dynamometer car and operating it in trains between Boone and Carroll. These gifts and the splendid co-operation of the Chicago & North Western Railway, are acknowledged with appreciation.

ADMINISTRATIVE WORK.

The administrative work of the college is centered largely in a few offices, the President's Office being the head of all. Many matters of minor importance are cared for by different officers of the college or by the Finance Committee of the Board of Education, acting with the president. All of the most important items are presented by the president of the college to the Board of Education for definite action as to policy. The actions of the Board of Education are carried out through regular administrative channels.

The President reserves much time for consultation. He attends and presides at practically all meetings of the Board of Deans, at the College Faculty meetings, and at as many as possible of the division faculty meetings.

The College Faculty is the legislative body for college affairs. Many legislative questions relating exclusively to divisions are handled by division faculties. The Board of Deans consists of the dean of each division and vice-deans where appointed, the dean and vice-dean of the Junior College, and the president. The Board of Deans does not legislate but assists in determining upon and carrying out executive actions.

The Secretary of the College, Dr. E. W. Stanton, is also vice-president and dean of the Junior College and head of the Department of Mathematics. As Secretary, he keeps all records of the actions of the Board and Finance Committee relating to the college, keeps accounts of all appropriations, and audits all bills. He also keeps records of contracts and agreements. In the Secretary's office a large amount of detail work is well handled. As Dean of the Junior College, Dr. Stanton supervises the classification of all freshman and sophomore students. He gives personal attention to many individual cases where students need help or advice or caution in reference to their work. In this office the records of all students in the Junior College are kept.

The College Treasurer, Professor Herman Knapp, also acts as purchasing agent and registrar; and he has charge of the formal announcements of courses of instruction. The Treasurer receives funds from the United States Government, from the State Treasurer, and from fees and other local sources, and he pays out funds as properly directed. As Registrar, Professor Knapp has charge of all records of entrance into the college and all class standings. As Purchasing Agent, he makes all purchases required by the college except cream and milk in the Dairy Department. Bids are called for whenever this is desirable, and orders are issued on blanks especially provided for the purpose. The College publications include the general catalogue, the college directory and various circulars giving information in regard to the college and its courses of instruction. Bulletins issued by the experiment stations and the extension departments are referred to elsewhere.

Mr. Thomas Sloss, the Superintendent of Grounds and Buildings, has general supervision of the campus and all college structures. He reports directly to the President. The Superintendent has supervision of the college heating and lighting plant and of workmen employed on the campus, including janitors. Superintendent Sloss is an experienced builder, and the college has availed itself of his knowledge along this line on various occasions. At the present time he is in charge of the construction work on two buildings which could not be finished according to contract because of the failure of the contractor. The Superintendent of Grounds and Buildings has immediate charge of funds appropriated for Repairs and Minor Improvements and for Maintenance and Improvement of Grounds. On account of the increasing size of the plant, additional funds are needed for both of these purposes.

The College Hospital is supported from the payments made by students as incidental fees. A physician and two trained nurses are in constant attendance. The health of the community is considered above par, yet in the course of the year there are many cases needing hospital attention. The following table shows the number of cases cared for during the biennium:

	1914-15	1915-16
Total number of bed cases	360	378
Total number of dispensary cases	11,160	10,927
Total	11,520	11,305

There were two fatal cases in each of the years.

Provision has been made for a new hospital, and construction will begin this fall.

The clerical work in the administrative offices continues to increase. Obviously this would be the case with the increasing enrollment. As many as one hundred letters a day are handled in the President's Office. Some additional clerical help is needed in the administrative offices so as to permit the officers of the college to give their time and energy to more important duties.

FINANCES.

The financial operations of the college are given in detail in the reports of the Secretary and Treasurer. The State appropriations which will be available in 1916-17 for regular teaching work at the college and for equipment, maintenance of equipment, improvements and contingent requirements are as follows:

Acts and Purposes	Educational work at Ames	Equipment, repairs, improvements, etc.
Sec. 2, S. F. 288, 36 G. A.:		
Permanent collegiate support fund	$ 505,000	
Summer Session	20,000	
Two-year and four-year courses in home economics for homemakers and teachers	20,000	
Sub-collegiate courses in agriculture, home economics and engineering	54,000	
Contingent fund, repairs, and minor improvements		46,000
Library, books and periodicals		5,000
Maintenance and improvement of public grounds		10,000
Sec. 2, S. F. 242, 36 G. A.:		
Additional equipment and furnishings for buildings and departments		52,500
Repairs and improvements for dairy building, old agricultural hall and barns, temporary provisions for fruit storage, and small buildings and additions to buildings		13,250
Temporary provisions for home economics laboratory		750
	599,000	127,500

Note: In 1915-16 special additional appropriations were available in the biennium for construction of the following improvements, (S. F. 242):

Extension of heating system and equipment of heating plant	$ 32,000
Settling and storage water tank and connections	15,000

National funds, including income from endowment funds, available for educational work amount to practically $85,000.

A special biennial state appropriation provided a fund of $150,000 for construction of buildings in 1915-16 and the same amount in 1916-17.

A large part of the appropriations available to the college is for the support of Industrial Service work, including experimental, extension and short course work, which is entirely apart from the educational work at the college. Frequently the error is made of assuming that experiment station funds and all other sums appropriated for Industrial Service work performed by the college are used for regular instruction work. Such funds are referred to elsewhere in this report.

I consider that the following additional appropriations are necessary in order to provide for the continued growth of the institution and to maintain its standard of work:

A. ADDITIONAL SUPPORT FOR EDUCATIONAL WORK AT THE COLLEGE, ANNUALLY BEGINNING JULY 1, 1917.

1. Collegiate departments	$193,950
2. Summer Session	10,000
3. Non-Collegiate courses in agriculture and home economics and trade school work in engineering	23,180
4 Contingent fund, including repairs and minor improvements	5,000
5. Library, books and periodicals	15,000
6. Maintenance and improvement of public grounds	5,000
Total	$252,130

B. SPECIAL APPROPRIATIONS FOR IMPROVEMENTS OF THE COLLEGE, GROUNDS AND BUILDINGS, INCLUDING EQUIPMENT AND MINOR STRUCTURES, ONE-HALF OF WHICH AGGREGATE MAY BE USED EACH YEAR OF THE BIENNIAL PERIOD BEGINNING JULY 1, 1917.

7.	(a) Additional equipment and furnishings for buildings and departments, including buildings now under construction		*$150,000
	(b) Equipment for buildings authorized but not now under construction		56,000
8.	Extension of heating system and additional equipment for the heating plant.		
	(a) Tunnels	$75,000	
	(b) Heating plant equipment	16,000	91,000
9.	Sewer construction, including sewage disposal bed, and with understanding that not to exceed $8,500 may be paid to the city of Ames as a refund		20,500
10.	Repairs and improvements for stock barns, judging pavilions, and fences for farm, orchard and experimental plots		9,000
11.	Enlargements of buildings and small additional buildings		40,000
	Total for improvements		$366,500

C. SPECIAL ADDITIONAL APPROPRIATIONS FOR THE CONSTRUCTION OF BUILDINGS AND PURCHASE OF LAND.

The following buildings and land are most needed at this time:

12.	Library (supplementary to $95,000 already available)	$155,000
13.	Home Economics buildings	275,000
14.	Physics building (part)	100,000
15.	Coliseum	100,000
16.	Beef Cattle barn	25,000
17.	Veterinary Building addition	35,000
18.	Shop and storerooms	25,000
19.	Dormitory (self-supporting investment)	70,000
	Total for buildings	$785,000
20.	Animal Husbandry farm and equipment	$ 75,000
21.	Horticultural farm and equipment	12,000
22.	Additional property near the campus	43,250
	Total for land and equipment	$130,250

Additional needs which should be cared for in the near future include a veterinary research and serum farm, a drill hall, and other buildings.

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*In addition to balance available from the collegiate support fund, as heretofore.

REPORT BY THE PRESIDENT OF THE COLLEGE ON INDUSTRIAL SERVICE WORK, INCLUDING EXPERIMENTAL AND EXTENSION WORK, IN THE BIENNIUM JULY 1, 1914, TO JUNE 30, 1916, WITH RECOMMENDATIONS FOR APPROPRIATIONS FOR THE BIENNIUM BEGINNING JULY, 1, 1917.

R. A. PEARSON, PRESIDENT.

EXPERIMENTAL WORK.

Experimental work is conducted in connection with all of the main lines of work given at the college. Special appropriations for its support are made through the Agricultural Experiment Station, the Engineering Experiment Station and Veterinary Investigations.

A great number of problems arise in connection with the agricultural and other industrial life of the state. The people must know about materials for construction, substances used in agriculture and in manufacturing, diseases and pests of animals and plants, and changes taking place in the soil. Questions along these and other lines are received from large numbers of Iowa citizens. When the question is one which concerns many and appears to be important, a special effort is made to send a full and helpful reply, and if sufficient facts are not at hand then investigations are conducted to secure these facts. A large part of the industry and business of the state rests upon the work of the expert. A great manufacturing plant or a vast agricultural domain might maintain its own corps of investigators. Some do so, but the statistics that make Iowa farms and factories famous are made up of small items gathered from independent units where it would be impossible to maintain experimental equipment of a high order. The wealth represented by these units constitutes the bulk of the wealth of the state, and the experiment stations are popular and necessary because the interests to be served are enormous and the needs are very great. It has been said that the average farmer spends far more than ten dollars a year in experimental work. This is well. The funds so expended are used to advantage and the experiments conducted are helpful. They are worth much more than they cost.

They are experiments which can be carried on with such equipment as the farmer may command. The cost of the Agricultural Experiment Station amounts to much less than a dollar for the average farm a year, assuming that the farmers pay the entire cost. This amount sinks into insignificance when it is realized that because of our agricultural experiment stations farmers are now saving millions of dollars which would otherwise be lost from such causes as oat smut, the Hessian fly, and other pests and diseases, which destroy wealth that has been created. Furthermore, because of the agricultural experiment stations, farmers may add millions to their wealth through the use of better seed, which produces larger crops, and through better systems of feeding, which make more economical meat. Similar statements may be made in reference to engineering experimental work, which deals with the strength and serviceability of drainage tile, the economy of the gas engine, the durability of road materials, etc. In a state having live stock valued at nearly half a billion dollars, it does not seem necessary to argue that the expenditure of ten or fifteen thousand dollars a year to investigate animal diseases is desirable. The fact is that increased appropriations for all lines of investigational work would be an economy to the state.

AGRICULTURAL EXPERIMENT STATION.

The scope of this work has been slightly extended, and valuable help at minimum cost has been added through the appointment of a limited number of highly trained men as research fellows. These men, usually, are graduates of other institutions and they are working for advanced degrees at Iowa State College. They receive only nominal compensation on account of their services in the Experiment Station, considering the instruction received as part salary.

A practical piece of work which promises to mean much to the agriculture of this and other states was the perfection of a simple machine by which legume seeds have their outer shell scarified to permit moisture to gain access to the germ. The use of this simple device results in greatly increasing the percentage of germination of the seeds, and especially is this true of certain varieties of legume seeds which have particularly hard, resistant outer coatings. When seed is treated by this machine, less of it will need to be used. The saving will reach a large sum. Farmers report that they have secured a better stand with five pounds of scarified sweet clover seed per acre than they formerly secured from twenty pounds of untreated seed.

Investigations of Iowa soils have continued, with the result that more information is now available in reference to limestone requirements, thus leading to the wider use of clover and alfalfa.

New and better methods of hog feeding have been devised. Some improvements in methods of pasteurizing milk and cream have been suggested. The new varieties of oats, Iowa 103 and Iowa 105, continue to be distributed to Iowa farmers, and with excellent results. Reports from about one hundred farmers who tested out these varieties beside the best oats formerly available to them, show an increase of approximately five bushels an acre in favor of the new oats. A simple computation shows that if the Iowa acreage of oats could be planted to one of these new varieties, the increased production would be worth more than $5,000,000 a year.

A new variety of winter wheat now developed in the experiment station has been tested several years here, and was recently tested by certain Iowa farmers. It promises to furnish a hardy wheat which will save losses from winter killing.

A new variety of corn, which promises well, is now being tested out in the southern part of the state.

County soil surveys have been continued and, although the workers are proceeding slowly for want of funds, they are securing much valuable data. These surveys reveal important facts concerning the quantity and character of plant food in the soil. This question bears upon deficiencies of plant food, which has already become noticeable in some sections of the state. Some people think that Iowa soils are inexhaustible. In respect to some food constituents, they appear to be so; but in respect to others which are vital to the growth of plants the changes are becoming noticeable. However, some of these can be offset very easily. To do so we must have more accurate knowledge of what the soil contains and of its physical character. The demand for county soil surveys is very urgent. Petitions containing names of thousands of Iowa taxpayers are on file awaiting their turn. Without doubt, a large increase of funds for this work could be used to great advantage. At the present time, Iowa is behind other states in taking an inventory of its soils.

In his report for the biennium, Director Curtiss emphasizes, also, the value of co-operative field experiments and feeding experiments in different parts of the state and the need of extending this work for the good of the live stock interests of the state. A slight change in the interest of economy in feeding a hog means much when it is remembered that ten million hogs annually are marketed from Iowa.

Experimental work is being conducted in capon production, devices to encourage larger egg production, and the keeping quality of eggs.

Attention has been given, also, to certain problems of the home, including the action of yeasts and the relations between certain substances when combined in cooking. Important investigations need to be made in connection with canning fruits and vegetables. Already some observations, especially in reference to bacterial actions, have been made by the Experiment Station experts. The extension workers in the field of home economics bring in many practical problems for the experiment station to solve. While valuable work has been done along these lines, much more needs to be done, and the women of Iowa are asking that these problems be studied.

The Botanical and Bacteriological Sections have done some valuable work which is fundamental to great processes in agriculture. Some of these investigations are still uncertain as to outcome, but some promise so well that the final results are awaited with keen interest.

In the Botany Section, many samples of seeds have been examined for their purity and vitality, with results that have made farmers realize the importance of this work and the dangers of buying impure seed.

The Chemical Section is engaged in the study of practical problems relating to forage plants and methods of analysis.

The Dairy Section is continuing experiments in reference to several dairy products and flavors, keeping qualities, and detrimental conditions affecting them.

In his report Director Curtiss mentions other interesting and highly valuable lines of work, including experiments in honey production; observations in reference to farm tenantry, which is a subject of the utmost importance to this state and the seriousness of which is but little realized; grape growing; profitable apple growing; the treatment of several diseases of fruit trees which have not become serious until in recent years; sweet corn; agricultural engineering and farm building construction, and still other topics. For each average day of the year Iowa farmers spend one million dollars on new buildings. Fifteen complete farmsteads are erected each average day, in Iowa. The Agricultural Engineering Section is devoted to the improvement of farm buildings, to making them more serviceable, less costly and of better appearance. This work does not compete with the architect. It would be done without an architect. The subject calls for much investigation as well as instruction.

It is worthy of special note that the investigation of apple orchards has brought out the fact that, with good care, an orchard in Iowa may be made highly profitable. Under the care of college experts, a 30-acre orchard in the western part of the state has had its production raised from 3,500 bushels in 1911 to 14,000 bushels in 1915. A practical orchard man claims that, with such care, this orchard would now return a net of 6% annual dividend on a valuation of $1,000 an acre.

The following information is taken from the reports of Director Curtiss and Vice Director Stevenson for the two years of the biennium:

Investigations were completed and publications issued as follows:

Agronomy: Bulletins Numbers—151, Soil Acidity and the Liming of Iowa Soils; 151 (Reprint), Soil Acidity and the Liming of Iowa Soils; 157, Improvement of Peat and Alkali Soils; 161, Maintenance of Fertility in the Wisconsin Drift Soil Area in Iowa. Research Bulletins numbers 17, Determination of Ammonia in Soils; 18, Sulfofication in Soils; 24, Determination of Amino Acids and Nitrates in Soils; 25, Bacterial Activities and Crop Production.

Agricultural Engineering: Bulletins Numbers — 152, Colony Hog Houses (in co-operation with the Animal Husbandry Section); 166, Community Hog Houses (in co-operation with Animal Husbandry Section); 166 (Abridged), Community Hog Houses.

Animal Husbandry: Bulletins Numbers—152, Colony Hog Houses (in cooperation with the Agricultural Engineering Section); 165, Influence of Environment and Breeding in Increasing Dairy Production; 166, Community Hog Houses (in co-operation with Agricultural Engineering Section); 166, (Abridged), Community Hog Houses; Research Bulletin number 30, Inheritance of Color and Horns in Blue Gray Cattle.

Bacteriology: Research Bulletin Number 22, Ropy and Slimy Milk.

Botany: Research Bulletin Number 23, Relation of Moisture in Alfalfa Production.

Chemistry: Research Bulletins Numbers—16, Chemical Changes During Silage Formation; 26, Studies on the Determination of Sulfur as a Barium Sulfate.

Dairy Section: Bulletins Numbers—154, Pasteurizing Milk in the Final Package; 156, Pasteurization of Cream for Butter Making; 164, Studies on the Market Milk of Iowa; 164, (Abridged), Studies on the Market Milk of Iowa. Research Bulletins numbers 19, Bacteriological Studies of Evaporated Milk; 20, Bacteriological Studies on Two Yellow Milk Organisms; 27, Studies on the Formation of Gas in Milk; 28, Studies on the Clarification of Milk; 29, Studies on the Bacteria in Milk; 31, Studies on the Creaming Ability of Milk.

Entomology: Bulletins Numbers—155, Potato Insects; 162, Two Strawberry Slugs; 162, (Abridged), Two Strawberry Slugs.

Farm Management: Bulletins Numbers—159, Farm Leases in Iowa; 159 (Abridged), Farm Leases in Iowa.

Horticulture and Forestry: Bulletins Numbers 153, An Apple Orchard Survey of Mills County; 158, Preservative Treatment of Fence Posts; 158 (Abridged), Preservative Treatment of Fence Posts; 160, Grape Pruning; 163, Late Potato Blight in Iowa; Research Bulletin number 21, Hardiness in the Apple as Correlated with Structure and Composition.

Circulars were issued as follows:

No. 15, (Reprint) Testing Soils in Laboratory in Field.
No. 16, (Reprint) Care, Feed and Management of the Dairy Herd.
No. 19, The Control of Chicken Mites and Lice.
No. 20, Making Old Orchards Profitable.
No. 21, A Corn Stalk and Corn Root Disease in Iowa.
No. 22, The Hessian Fly.
No. 22, (Reprint) The Hessian Fly.
No. 23, Some Common Corn Insects.
No. 24, Successful Swine Rations for Corn Belt Conditions.
No. 25, Tests of So-Called Hog Cholera Cures and its Specifics.
No. 26, Fertilization of Lawns and Garden Soils.
No. 27, Renewing the Shelter Belt.
No. 28, Seed Corn for 1916 Crop.
No. 29, White Grubs in Iowa.

Press Bulletins were issued as follows:

No. 36, Announcement of the Perfecting of a Machine for Increasing the Germination of Legume Seed.

The above publications include 1,842 pages, and the total number of copies in all editions was about 800,000, representing more than ten million printed pages for each year of the biennium.

As is usual, a large quantity of material is completed and ready for publication and will appear as rapidly as final editing and funds available for publications will permit.

Changes in the Staff During the Biennium.

The following appointments were made:

W. G. Kaiser, Assistant in Agricultural Engineering.
H. B. Munger, Chief in Farm Management.
Knute Espe, Assistant in Soil Survey Work.
A. R. Lamb, Assistant in Chemistry.
S. B. Kuzirian, Assistant in Chemistry.
A. T. Erwin, Chief in Truck Crops.
Martin F. P. Costelloe, Acting Chief in Agricultural Engineering.
William W. Stanfield, Assistant in Farm Crops.
Harlan W. Johnson, Assistant in Soils.
Gerald P. Plaisance, Assistant in Chemistry.
Gramille Wade Roark, Jr., Assistant in Chemistry.
Daxter E. Bailey, Assistant in Dairying.
George Henry VonTungeln, Chief in Rural Sociology.
George Miller, Assistant in Dairy.
C. E. Bartholomew, Assistant in Entomology.
F. S. Wilkins, Assistant in Farm Crops.
A. C. McCandlish, Assistant in Dairy Husbandry.

The following resignations were accepted:

J. B. Davidson, Chief in Agricultural Engineering.
Martin E. Sar, Assistant in Soils.

Elmer L. Scales, Assistant in Farm Crops.
J. W. Bowen, Assistant in Chemistry.
Philip L. Blumenthal, Assistant in Chemistry.
S. C. Guernsey, Assistant in Chemistry.
George Miller, Assistant in Dairy.
Ray E. Neidig, Assistant in Chemistry.
C. W. Porter, Assistant in Agricultural Engineering.
F. S. Wilkins, Assistant in Farm Crops.
William W. Stanfield, Assistant in Farm Crops.

H. E. Summers, Chief in Entomology, is on leave of absence on account of illness.

One death has occurred in the staff, Miss Harriett Kellogg, Assistant in Botany.

Improvements completed and provided for include considerable under-drainage, as well as a residence for the superintendent of the new experimental farm and certain minor buildings, besides fencing and the addition of various equipment.

It is doubtful if the work of the Experiment Station has at any time been of greater practical value to the farmers of the state. Special attention was given during the year to practical problems that the farmer deals with from the standpoint of the management of his soil, the production of crops, the feeding and breeding of live stock, the construction of farm buildings, the growing and marketing of fruit and truck crops, the production of dairy products, and general farm management questions. During the year, thousands of letters came to the station from citizens of the state asking for practical and helpful information upon a variety of subjects along the lines just mentioned.

The Staff recognizes the fact that it is the function of the station to carry on some investigational work of a strictly scientific nature. The fact is not overlooked, however, that the station must also deal with a large number of practical problems that the farmer must deal with every day in his farming operations. It is ever the purpose of this station to maintain a balance between this strictly scientific work and a study of the every day problems of the farmer. The work of the past year gives evidence that the staff succeeded admirably in working in accord with this principle.

The station has coöperated in numerous ways with farmers, county agents and other parties. This work has the endorsement of those who are in touch with it. The station has been especially successful in reaching farmers and influencing farm practice through its coöperative work with county agents and farmers.

ENGINEERING EXPERIMENT STATION.

The engineering experiment station work is conducted in two main divisions. One includes general engineering experiment station matters covering all lines of engineering research applicable to this state, except good roads work, which constitutes the other division.

Several investigations have been completed and manuscripts await publication; but this is not possible because of limited funds. It is a surprise to a layman to learn of the enormous interests within this state that depend more or less upon such information as is developed in an engineering experiment station. These problems come near to the life of the people and affect, directly, their financial interests.

Director Marston submits the following as some of the more important special lines of research conducted during the last biennium:

Electric Central Station Operation in Iowa.
The Use of Oil Engines for Power Stations.
Electric Lighting Plants for Private Houses.
Making and storing Ice on the Farm.
Locomotive Tests and Comparative Value of Iowa and Illinois Coals.
Electric Water Pumping.
Investigation of Iowa Fire Clays.
Method of Drying Iowa Clays.
Investigation of Aggregates for Concrete.
Investigation of Iowa Pavements.
Durability Tests of Iowa Drain Tile and Sewer Pipe.
Strength of Reinforced Concrete Culverts.
Testing of Flour for Iowa Milling Industry.
Investigation of Theory of Loads on Pipes in Ditches.
Investigation of Theory of Loads on Culverts.
Investigation of Sewage Disposal Plants for Private Homes.
Investigation of Sewage Disposal Plants for Schools.
Laboratory Study of Materials for Roadway Surfaces.
Investigation of Prepared Roofing Materials.
Investigation of Rust Resisting Properties of Metal Culverts.
Investigation of Inhibitive Properties of Paints.
Investigation of Road Drainage.
Investigation of Garbage Disposal for Iowa Towns.
Investigation of Use of Hollow Tile for Small Buildings.
Investigation of Load Distribution on Bridge Floors.
Investigation of Interpretation of Water Analysis.
Standardization of Disinfectants.
A Study of Iowa Coals.
Investigation of Automobile and Lubricating Oils.
Investigation of Effect of Bedding on Strength of Drain Tile and Sewer Pipe.
Study of Different Tile Systems for Drainage.
Operation and Observation of Drainage Experiment Stations.
The Insulation of Kilns.
The Operation and Care of Small Telephone Central Station Outfits.

Special attention has been given to different kinds of materials for road surfaces. Experiments have been conducted with bituminous surfaces applied to concrete bases, on the campus of this college and on the concrete road between Mason City and Clear Lake; but attention has been given more extensively to the construction and maintenance of gravel roads. The study has included the application of road oils to gravel. These experiments have been conducted near Fort Dodge, Spirit Lake and Rockwell City. Some experiments are being made, also, on the application of oil to earth roads.

The technical service work conducted through the engineering extension office is intimately connected with the experiment station work. The technical service bureau gives attention to questions that cannot be cared for by engineers in private practice. At many places in the state assistance has been given in the development of engineering questions of public interest. Considerable help has been given to state departments and institutions.

Dean Marston emphasizes the need of increased appropriations to retain the services of present employees and, to a small extent, increase the work along lines that are being strongly urged upon us.

One investigation needing special attention is an extension of work already done in connection with standards for drain tile. Cement pipe manufacturers and users now are in need of similar experiments for the larger tiles or pipes and for the want of this information important work in the state is being held up.

The Engineering Experiment Station staff consists of the following men:

One director, seven professors and two associate professors, who devote only a limited portion of their time to the work, and whose duties are, to an important degree, of an administrative character, although they are expected to do as much investigational work and writing of bulletins as practicable.

The following constitute the staff for conducting most of the regular investigational and testing work of the station:

One assistant to the director, half time.
One professor, one-third time.
One professor, one-tenth time.
One associate professor, one-seventh time.
One assistant professor, one-seventh time.
One industrial engineer, one-third time.
Three engineers, full time.

One chemist, full time.
Two laboratory assistants, full time.
One mechanician, half time.

The following bulletins have been published during the biennium:

Bulletin No. 37. Illuminating Power of Kerosenes.
Bulletin No. 38. Electric Central Station Operation in Iowa.
Bulletin No. 39. Good Roads and Community Life.
Bulletin No. 40. An Investigation of Iowa Fire Clays.
Bulletin No. 41. Sewage Disposal for Village and Rural Homes.

Additional manuscripts are ready for publication.

VETERINARY INVESTIGATIONS.

The veterinary research work has suffered by reason of the continued absence of Dr. Schern, who has been detained in Europe on account of the war. But good work has been accomplished by Dr. Murray and Dr. Willey of the Veterinary Division staff. This work is of the highest importance to the live stock interests of the state, and live stock men have often expressed this view. During the biennium much attention has been given to the examination of tissues and to laboratory diagnoses. Large numbers of specimens are received from veterinarians and farmers, with the request that these be examined and that information be returned. Thus the laboratory has assisted veterinarians in the diagnosis of many doubtful cases and it has sent advice to many stock men who were unable to secure veterinary service. Special attention has been given, also, to the investigation of animal diseases with reference to their causes and special treatment. Reports have been prepared upon paralysis of swine and upon serum treatment of hemorrhagic septicemia. In connection with this latter disease some significant results have been obtained, and the work should be carried on further to verify what has been done, when it is hoped that some highly valuable conclusions may be published. Contagious abortion of cattle is another disease under investigation. This disease causes very heavy losses throughout the country.

Roup and fowl cholera are being studied with good promise of results that will be worth much to the poultry interests.

The value of the diagnosis work conducted in the veterinary research department may be appreciated by a statement of the number and character of diseases diagnosed from specimens received as follows:

Hemorrhagic Septicemia—Cattle 80, Horses 8, Sheep 22, Fowls 5.
Tuberculosis—Cattle 10, Fowls 27, Hogs 49.
Blackleg—Cattle 21.
Parasitism—Cattle 7, Horses 5, Sheep 4, Fowls 11, Hogs 22.
Roup—Fowls 35.
Rabies—Horses 2, Dogs 8, Hogs 5.
Infectious Abortion—Cattle 38.
Hog Cholera—65.
Silage Poisoning—Cattle 3, Horses 3, Sheep 5.
Infectious Rhinitis—Hogs 7.
Caseous Lymph-adenitis—Sheep 7.
White Diarrhea—Chick 1.
Glanders—Horses 2.
Infectious Enteritis—Hogs 9.
Entero Hepatitis—Turkeys 2.
Actinomycosis—Cattle 1.
Johnes Disease—1.
Anthrax—Cattle 2.
Paralysis of Swine—31.
Malignant Oedema—Horse 1.
Leukæmia—Cattle 2, Horse 1, Hog 1.
Tumors—Horses 14, Cattle 5, Chicken 1.
General Cases—122.

EXTENSION WORK.

Extension work is developing rapidly throughout the United States. A great impetus has been given by national legislation and the recognition by Congress and by many legislatures of the high value of this kind of work. In our college the extension efforts are directed from two offices, each responsible directly to the president. But these offices, as all others on the campus, coöperate closely with other departments having similar interests. Special emphasis is given to the importance of extension workers keeping in close touch with investigators and college teachers engaged along the same lines of work. Extension workers cannot ''extend'' the benefits of the college to the state as a whole unless they are in close touch with those who are working on new problems and perfecting our knowledge as is done in the college fields, shops, laboratories and classrooms. It is because of the necessity of this contact that extension work prospers best when closely associated with the college.

A notable feature of the extension work has been the close coöperation given by the public in the many communities where this work has been offered. The requests and demands from the public are responsible for the growth of this work. It has been impossible for the college to respond to all of these. The value of this kind of work to the state speaks for itself. It is an investment which is returned many fold.

AGRICULTURAL EXTENSION WORK.

(Including Home Economics, Science and Veterinary Medicine.)

Early in the biennium, R. K. Bliss of the University of Nebraska was appointed Director of Agricultural Extension work. Mr. Bliss was raised on an Iowa farm and had worked extensively in this state. Under his direction, the work has been greatly strengthened and extended. Activities that were not fruitful of good results, because not well adapted or because outworn, have been abandoned. The agricultural extension work is a dignified educational effort. It represents college training to a very large number of citizens of Iowa who look forward to the new courses of instruction from year to year.

A report of this work during the last biennium is being published as a bulletin. Only a few of the most important features are mentioned in this report.

The last year has been the most successful in the history of the agricultural extension work; 6,433 meetings were held. There were 3,356 demonstrations and 5,457 lectures; 1,037 exhibits were judged and 8,261 farms were visited. The total attendance at all lectures, demonstrations and exhibits was more than 600,000 people. For every working day of the year, this department held an average of twenty meetings, conducted eleven demonstrations, judged three exhibits, and visited twenty-six farmers on their farms. In one year 575,000 bulletins and circulars were used, 86,000 posters were distributed, 650,000 pages of mimeograph notes were issued. On each average working day of the year, 226 first-class letters and 51 second-class letters were received and cared for and 31 farm building plans were mailed. These figures represent only a part of the work that is done.

SHORT COURSES.

Last year 127 short courses were held. These were attended by 60,097 people. This method of work is regarded as especially efficient for the winter season. The courses continue from three to five days. Students are regularly enrolled and fees are collected by local committees to pay local expenses. The speakers take suitable laboratory material from the college. This includes live stock as well as typical varieties of seeds and models of improved farm and home equipment. More and more these short courses have become specialized; that is, more intense. Instruction is given along lines in which the local community is interested to the exclusion of general instruction which was necessary years ago when extension work began.

COUNTY AGENTS.

County agents are now employed in the following counties: Montgomery, Floyd, Scott, Emmet, Clay, Henry, Greene, Des Moines, Sioux, Hardin, Dickinson, Wright, Linn, Clinton, Black Hawk and Muscatine. In many other counties, organizations have been completed, or are being formed, for the purpose of starting county agent work. The county agent is himself an expert on some phase of agriculture, he is reasonably well posted on many others, and he knows where and how to get any available information at any time. He is both scientific and practical. His best work is done through coöperation with farmers and leading business men and citizens who are in sympathy. Through his effort, farmers' organizations are doing more effective work. His office has been called the clearing house for difficult farm questions and farm problems. A good part of the information which he uses to advantage on some farms is secured directly from other farms in the county. His hardest problems are referred to the experiment station at the college.

Last year these county agents (some of them employed only a portion of the year) held 3,199 meetings and demonstrations, with a total attendance of 91,642. This is in addition to the meetings and attendance reported under short courses. One county agent spent 235 days in visiting different places in his county and rode 8,907 miles in his automobile and 617 miles on trains. Another agent who has been in his present location four years reports, for that time, 27,029 miles in the automobile and 12,192 miles in trains. He has made 4,261 visits to farms, and, needless to say, he gave valuable advice on almost every visit. In the four years he received 3,892 visitors and over 3,000 telephone calls. For a period, he gave special emphasis to oat smut and better seed oats. On this subject he held 61 meetings with an attendance of 1,827 people. He has had eighteen spraying demonstrations, twenty hog cholera meetings and twenty-seven township school picnics; and he has made 215 visits to schools. He has held eight colt shows, made 654 addresses, written 8,533 letters, and mailed 76,124 circulars;

has contributed 1,188 articles in local papers and published descriptions of operations on 86 farms. There are now in his county 550 alfalfa fields as compared with only 12 in 1911 and 225 silos as compared with 88 in 1911. The percentage of oats treated for smut has increased from 5 to 77. Many more statistics could be given to show the wonderfully valuable work done by one man in his four years of service.

Mr. J. W. Coverdale is the state leader of county agent work and he is giving special attention to the important fact that county agents should not be appointed until there is a genuine demand for them from the farmers themselves. This demand is shown in the most conclusive way; namely, voluntary contributions from the farmers toward covering the necessary expense.

In the near future county agents will be called for in every county of the state, if we may judge by experience up to this time in this and other states. The United States government assists in carrying the expense of this work.

COW TEST ASSOCIATIONS.

The great benefit of these associations has been shown in European dairy countries, especially Denmark. A small group of farmers in a community form an association and employ an expert to visit their farms in turn, and to make observations and records which the farmers themselves have not time to care for even though they may have the training. The association usually has twenty-six members, so that one visit will be made at each farm each month. The expert records the amount of milk given by each cow and its butter fat test and the quantity and value of feed given to each cow. At the end of the year his records show the exact cost of and income from each member of the herd. It is interesting and sometimes comical to compare these exact records with the opinions of men as to what their cows are really worth. The poor cows are weeded out and better ones put in their places, with the result that the average yield and profit of the herd is increased. The expert gives good advice also as to cheapest and best feed mixtures, the selection of better bulls, more wholesome surroundings for the herd, the sanitary care of milk, the sale of stock, etc. Here is an illustration of the benefit of this cow testing work. A certain herd in 1912 showed an average profit per cow (income over cost of feed) of $22.12; in 1915 this was $74.38.

In connection with this work, bull associations are to be organized. Already a good start has been made. In this way better bulls will be introduced into the dairy districts. It is very noticeable that men who have experienced the benefit of the cow testing associations are the most ready to receive benefits from the bull associations.

The expense of cow testing association work is borne largely by the local people who are benefited. In the interest of thoroughness and uniformity, the college exercises certain supervision over the appointment and work of the expert.

BOYS' AND GIRLS' CLUB WORK.

There are 11,744 people actively interested in boys' and girls' clubs which are devoted to corn growing, gardening, baby beef, pigs, canning, cooking, sewing, wood work, and home work. With the limited facilities, it has seemed best not to encourage a larger membership. This work is highly valuable and should be more widely developed.

The boys' acre corn club contest was the largest project of the year. In thirty-eight counties individuals or institutions offered to provide the expense of a trip to the Panama-Pacific exposition for their most successful boy corn grower. In one county two such trips were offered. There was a trip offered to the boy making the best combined record in corn and pig club work. A generous friend arranged to pay for the trip of one boy making the best score in all of the unorganized counties so that all boys in the state had a chance. Forty-one of them, each the most successful in his group, enjoyed the trip to California. In addition to these trips, a large number of township prizes were offered to boys making the best records; and these prizes consisted of a trip to the short course at Ames. The local people offered smaller prizes for the second and third most successful boys. Three thousand four hundred and five were enrolled. Their friends were interested and helped, and their fathers helped, with the result that a large amount of information on corn growing was diffused. A representative of the extension department visited as many of the boys as possible and helped to stimulate them in their good efforts. Much credit is due to the bankers and business men and to the farmers and newspaper men and others who were responsible for the liberal prizes. Fifteen of the boys produced more than 100 bushels of corn per acre. The average of the forty-one successful boys was 92 bushels per acre, and the average of all in the contest was 73.5 bushels, or more than double the annual average for Iowa. The best record was made by Wade Hauser of Union, Iowa, who set a new state record of 150.1 bushels on one acre.

Naturally, these boys and others wanted the corn growing contest to be continued, and it was reorganized for the year 1916. The work is progressing with intense interest in all parts of the state. For this year many friends of the boys have again provided prizes in the form of a free trip to the International Live Stock Show in Chicago next December.

Similar work is being done through Pig Clubs. Senator Joseph Allen of Pocahontas county has provided forty-four trips to the Ames Short Course for boys winning in Pig Club contests.

Boys' Baby Beef Clubs have been formed in a large number of counties. Boys in practically every county in the state are interested.

The Garden Clubs have both boy and girl members, and the skill with which these young people produce and sell vegetables on small areas of ground is astonishing. The club members are encouraged to use their money for good purposes. Through the Canning Clubs, instruction is given that results in saving great quantities of fruits and vegetables that would be wasted.

The boys' and girls' club work is carried on in coöperation with the schools. The teachers are interested and in their own work they receive much help and encouragement from the experts in the extension department.

THE SEED CORN CAMPAIGN.

Owing to cold and rainy weather, the corn crop of 1915 was seriously affected. In some parts of the state it was found that the corn reserved by many farmers for seed purposes was very weak in germinating quality. A special campaign was organized, and it reached every township in 33 counties having about three millions of acres in corn. Much work was done, also, in other parts of the state, but in the special section referred to the situation was most serious and called for chief attention. Twenty-five thousand copies of a poster referring to proper methods of securing seed corn, were distributed through the aid of railroad station agents, postmasters, bankers, school teachers, many farmers, and others. Interested farmers in many localities were assisted in forming organizations for the purpose of ascertaining the quality and quantity of all local corn that might be available for seed. Experts tested this corn, and printed announcements were sent out telling the quantity and quality and price per bushel of corn held on the various farms. This represented an enormous undertaking, and great credit is due to many residents of the localities who carried much of the work and needed comparatively little help from the extension department workers after the efforts were well started. Several county agents rendered especially valuable help. Some of them initiated the work early in the fall and kept steadily at it all winter. The extension department furnished one expert for one month to each county requiring this help.

The corn crop this year is testimony enough of the efficiency of the work that was done. Farmers who would have used seed corn showing 50% or 60% germination were interested and instructed so that they used seed with much higher germination. It would be impossible to estimate the additional number of bushels of corn grown in Iowa because of this campaign. It has been said that the wealth produced would run into the millions.

Space does not permit extended reference to the publications issued through the extension department and to the excellent work being done in starting correspondence courses of instruction. Other lines that are receiving effective attention, and some of which are comparatively new, include the following:

Blue prints of common farm buildings are sent out. The value of farm improvements in Iowa is nearly half a billion dollars, and millions of dollars are expended annually in the erection of new farm buildings.

Demonstrations in growing farm crops are conducted now in twenty different counties. This work in different parts of the state is planned to emphasize improvements in crop growing.

The importance of keeping business records of the farm is being emphasized. Farmers are asking more and more for information as to best systems to adopt.

Farm tours are conducted annually. A large number of farmers in their automobiles form a party and visit different farms of the locality where especially good work is being done. They inspect one feature at one farm and another at the next farm. Lectures are given by the department experts and by farmers themselves. In this way attention is being drawn to alfalfa growing, silo construction, beautifying the farm home grounds, and many other subjects.

Useful work is being done in connection with the marketing of farm products and the purchase of supplies. Great benefits come to producers and consumers when, for example, eggs are properly sorted and packed according to the best known methods and when farmers unite in making their purchases. It is found that large savings can be effected by placing combined orders through local tradesmen.

Valuable work is done in coöperation with the state fair and local fairs, conventions, farmers' institutes, various farm organizations, and the press of the state.

The extension work in home economics is deserving of special mention because of its excellent organization, its popularity and the good results that come from it. The better home has an important place in all efforts for the improvement of agriculture, and the farmers themselves and their wives fully appreciate this fact.

The agricultural extension work is supported by funds appropriated by the national and state governments, and by those contributed locally. The Federal government is contributing increasing amounts annually on condition that their contributions will be duplicated. In view of the excellent results being secured and the benefits that would come from increasing the work, it is recommended that the state appropriate not only enough to duplicate the Federal allotment but such an additional amount as may be found possible. The special reason why the state should duplicate the government funds is that it is not desirable to extend government control over funds that are now in use which would have to be designated to offset government appropriations if new appropriations are not made by the state. Any change in the use or control of our present funds would endanger the management of the work now in progress.

ENGINEERING EXTENSION.

This work is under the immediate supervision of Director K. G. Smith, who received his special training in corresponding work in Illinois and Wisconsin. Its value has been clearly demonstrated. The work has not been over-developed, but allowed to grow gradually. In fact its growth has had to be restricted on account of limited funds.

The Technical Service Bureau is assisting municipalities and industries by giving technical advice such as it is not customary to secure from the professional engineer. This Bureau has helped municipalities start in the right way toward providing water supply, sewage, and garbage disposal systems. It gave preliminary advice to a city in connection with flood difficulties. It has assisted by sending out information relating to streets and their care, the disposal of city refuse, concrete sidewalk construction, city lighting, the care of automobile tires, the use of educational moving pictures, and various other subjects upon which the public needs advice and direction.

Educational moving picture films have been circulated through various schools and other agencies.

Automobile institutes have developed into a permanent line of work. Twenty-four have been held during the last two years. These are for the benefit of men who work in the garage and for those who drive cars. This kind of instruction is resulting in economics in automobiles and greater safety in their use. This work is now being carried on in coöperation with the Agricultural Extension Department, as it has been found to be an effective feature in their short courses.

Short term schools have been conducted for telephone operators and telephone plant men in about twenty places in the state. These have proved to be very helpful. For example, at Waterloo about 80 telephone operators engaged in that section of the state were given two days of instruction. An expert woman teacher explained how to give more uniform and more prompt and satisfactory service. Such instruction is of great value to the operators and to the whole community as well. At another school, 125 men were in attendance.

Short courses have been held at various points for painters and decorators. These courses, as the ones for telephone workers, continue one or two weeks and provide instruction for the people who are actually engaged in the industry and wish to learn how to do their work better. The labor organizations have expressed their appreciation for what the state is doing for them in these ways. Six courses for painters are planned for the present year.

Instruction is given also by correspondence and evening classes. The latter are held in coöperation with public schools and other organizations. In 1915-16 the enrollment in class and correspondence study was 551, and 229 certificates were issued for work completed and examinations passed. Industrial subjects are given prominent position in these classes. The expenses are cared for largely by fees. In the largest woodworking plant in Iowa, this work has recently developed into a definite school for young employees under the direction of their own efficiency engineer and two instructors. Engineering Extension courses of study are purchased and all expenses borne by the firm. Twenty-four boys are enrolled at present at the plant.

Correspondence work and short courses are being started for janitors, and it is found that these men and the persons employing them are glad to have instruction given as to ventilation, care of furnaces, and cleaning of buildings. In such work as this, science can be used to advantage and the men who have registered for this instruction have been greatly interested.

On the urgent request of employees of factories and others who were benefited by the engineering extension work, some work in home economics extension is being provided for the benefit of the homes of these industrial workers. Thus home economics is coming to be allied with engineering extension work just as it long has been allied with agricultural extension. The home economics work in cooking has proved to be the most popular, but there is a genuine interest also in the work in dressmaking and home decoration and home management.

The staff of the Engineering Extension Department includes nine men, two of whom are on part time.

Lines of work in greatest need of development are correspondence study, automobile instruction, visual instruction, and extension work for manufacturing plants. Increased appropriations for these purposes and for the larger development of the established lines of work are recommended.

STATE BIOLOGICAL LABORATORY.

This laboratory has continued to manufacture and distribute hog cholera serum under the provisions of the state law. A limited amount of inspection work has been done, and without doubt this has resulted in great improvement in the serum commercially manufactured at various points in the state and has had an important effect upon serum shipped into the state from outside producers. The original appropriation was for $35,000, and it was provided that the plant should be self supporting. We can report that the saving of hogs on account of serum produced in this state plant runs into the millions of dollars, and today the value of the plant and stock on hand somewhat exceeds the amount of the original appropriation. The plant has been improved so as to bring it in full conformity with the United States regulations. It seemed desirable to do this although the quality of the serum being made was the highest.

Great care is exercised in issuing certificates to use virus and serum, and it is gratifying to report that more and more these agents are being handled by competent veterinarians on reasonable terms.

Acting Dean Bemis and Dr. Cole, who is in immediate charge. report that during the biennium 8,218,200 c. c. of serum have been distributed, or enough to treat 205,455 hogs.

The laboratory is now paying some attention to the production of other biological products which were contemplated when the law was passed.

Some further improvements are needed to make the plant more serviceable and satisfactory; for example, a suitable disposal place for the carcasses of virus hogs and quarters for small animals used in the production of biological products. These improvements would not be costly.

During the year 1914-15 the laboratory produced 7,756,696 c. c., and during the year 1915-1916, 953,090 c. c. Much of the output of the former year was sold during the latter year. About 10 per cent of the serum used in the state is manufactured in the State Biological Laboratory. During the year 1914, 65 permits were granted to commercial companies to sell serum and virus in Iowa; in 1915, 78 permits; and in 1916, 62 permits. From one to four permits a year have been cancelled on account of conditions becoming unsatisfactory. The number of companies in Iowa selling serum and virus and not having United States government licenses was 10 in the first year of the biennium and 3 in the second. 703 veterinarians have licenses to use virus, and about 1,000 farmers have been licensed to use virus on their own herds. It is the policy of the laboratory to discourage the use of virus by farmers in all instances where reliable veterinary service is available, and in no case is a permit granted except upon reasonable satisfaction that the dangers as well as the advantages in the use of virus are appreciated.

In his report, Acting Dean Bemis refers to the advantage of the state inspection of serum producing plants and investigations conducted by the laboratory when extensive difficulty arises in connection with the use of serum. By reason of inspections and the licenses issued by the laboratory, which may be cancelled for cause, all persons producing and handling serum and virus recognize the importance of great care. During the last six months of the biennium, 67 investigations were made. These include the checking up of books and the methods followed in serum plants and branch offices as well as results in the field from the use of serum or virus. Dr. Bemis reports it to be his belief that the percentage of loss in herds treated would be found to be as good as in the preceding biennium, or better.

SHORT COURSES.

Special appropriations have been made for the support of short courses at the college. These are given at different times and usually continue five or six days. The largest work along this line occurs in the week between the two college semesters, about February 1st. Last winter more than 2,000 people, chiefly Iowa farmers, registered in this course, and hundreds of others attended for a brief period.

AGRICULTURE.

Classes and laboratory sections were conducted by the different agricultural departments with instruction adapted to the requirements. Emphasis was given to stock judging, fruit tree spraying, farm management, seed selection, dairy and creamery operation, etc. The classrooms were filled and often overflowing. Frequently more than a dozen exercises were in progress at the same time. The ''students'' were advised to select the subjects in which they were most interested, and the schedule was arranged so that the engagements anyone might wish to make would not be in conflict. It was impossible, however, to avoid all conflicts. As in the past, the killing of meat animals and the curing of the meat proved to be very popular. Again the need of better facilities for this kind of instruction was shown.

A large number of boys and girls were present and special classes were arranged for them. About 200 of these came with all expenses paid as prizes on account of achievement in agricultural contests. The exhibits of canned fruits and seed corn prepared by some of these young people would have been creditable at a state fair.

This short course afforded an excellent opportunity for county agents and junior club leaders to come together for conferences concerning the progress and improvement of the work.

Evening programs attracted large audiences. Well known speakers on important agricultural topics were secured especially for these night meetings. On one evening a banquet was attended by 400 persons; others were not able to enter because of limited space. At this banquet, the Iowa farmers and their problems filled a most interesting program.

ENGINEERING.

Perhaps the most largely attended lectures were those on the automobile. It was necessary to find larger lecture halls, and even then some lectures had to be repeated. A very large proportion of the people attending the short course have automobiles, and they realized it would be distinctly to their advantage to know more about the machine and its use.

Special instruction was given in concrete work, such as making fence posts. Sewage disposal and water supply for farm houses and isolated town houses were explained. Electric wiring and the construction of permanent farm buildings were illustrated. The short course students had opportunity to try their hands at these different kinds of work under expert supervision. Farm drainage, ceramics, and other appropriate subjects also were included.

HOME ECONOMICS.

The Division of Home Economics gave suitable instruction to a large number of women. The work covered the usual range of subjects and also proved to be popular, as was shown by the registrations.

VETERINARY MEDICINE.

This short course is given in the fall, especially for veterinary practitioners. The third such course, just given, showed a total registration of 66. The main effort was to explain recent developments of veterinary science, including such subjects as immunity, parasites, and surgery. Instruction was given in clinics and by lectures and laboratory work.

COUNTRY NEWSPAPERS.

A special short course is given for country newspaper men, with emphasis upon agricultural developments. There is much complaint about farmers and especially the farmers' boys going to town to live. Probably no influence to counteract this tendency is so strong as the influence that can be exerted by the country newspapers.

FINANCES.

The expenditures for industrial service work performed by the college are included in the reports of the Secretary and Treasurer. The following amounts are available from State Appropriations for industrial service work, including experimental, extension and short course work, during the year 1916-17.

Acts and Purposes	Amount
Sec. 2, S. F. 288, 36 G. A.:	
Winter short courses in agriculture, home economics and engineering and trade school work	$ 9,500
Veterinary practitioners' courses	2,500
Engineering experiment station	15,000
Good roads experimentation	10,000
Agricultural experiment station	115,500
Agricultural and home economics extension	90,000
Engineering extension and trade schools	25,000
Veterinary investigations	12,500
	$ 280,000

The national government provides $30,000 for agricultural experiment station work and $44,432.16 for agricultural and home economics extension.

The hog cholera serum plant does not receive any appropriation for support but is operated on a self-supporting basis.

It will be to the best interests of the state to develop the industrial service work performed by the college and I recommend that the following additional annual appropriations be provided for the lines of work indicated.

1. Agricultural Experiment Station	$70,000
2. Engineering Experiment Station	15,000
3. Good Roads Experimentation	5,000
4. Agricultural and Home Economics Extension	36,000
5. Engineering Extension	8,500
6. Winter Short Courses	2,000

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